SCHOOL OF ENGINEERING
AMERICAN UNIVERSITY OF BEIRUT

ARCHITECTURAL PROJECT: NURSERY SCHOOL
DESIGNED BY: VICTOR SHIBER
DATE: March 31, 1956

SCHOOL OF ENGINEERING

PROJECT REPORT

AMERICAN UNIVERSITY OF BEIRUT

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S C H O O L O F E N G I N E E R I N G

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American University of Beirut
Beirut, Lebanon
31 March 1956

Professor Raymond Ghosn
School of Engineering
American University of Beirut
Beirut, Lebanon

Dear Sir:

In partial fulfillment of the requirements for the degree of Bachelor of Architectural Engineering, I submit herewith my thesis entitled "Nursery School".

Very truly yours,

Victor G. Shiber

VGS:hs

"For ideas are like seeds sown by birds and by winds, you cannot tell where they will flourish, but when they are grown you may trace their kind and their family relationship."

FROEBEL EDUCATION TODAY

By Barbara Priestman

I. INTRODUCTION

It is very sad to see that a big percentage of pre-school children in Lebanon do not receive due care and guidance for their development, and as a result, not many of them reach a certain well-recognized standard in society.

Pre-school children need the companionship of other children, and when they learn how to play together without fighting over trivial matters, they will respect what belongs to others when they grow up.

The author could hardly believe his eyes the first time he saw a three-year old kid selling chewing gum at one time, and begging for a penny at another, in front of the main gate of the American University of Beirut. This same boy was again noticed bare-footed on a cold and rainy day at 11:00 p.m. with his elder brother, arguing with or rather begging a tax-service driver to take them down town each at 10 Lebanese piasters. Fortunately, the man agreed on the bargain simply because he had no other customers at that critical moment.

The above incident is only one of a hundred others that can be located in different areas of the city. It was simply meant to bring forth the important role that nursery schools play in the development of any society's culture. The only place for such kids is the nursery school run either by the government for those who cannot afford attending one or by private enterprise. In Lebanon, to assume the running of a nursery school, it would be better if it is owned and controlled by a cooperative society of parents and teachers. Nursery schools not only educate children but parents alike.

They offer the open-air life, the space for free activity, the garden, the abundant apparatus and toys essential for the best physical and mental development of all young children who dream of such facilities.

The lack of nursery schools for little children is quite obvious in Beirut. The few examples that exist indicate that such schools lag behind the latest ones of other advanced countries in this respect.

It is not the aim of this report and project to detect the weak points or aspects of existing nurseries in Beirut, nor is it for being a mere architectural engineering problem. Its real purport is to set forth the essential steps for the establishment of a good functional nursery school. It is apparent that there is a ready demand for such a beneficial service and it is hoped that ultimately there will be several such Arab nursery schools in Lebanon and other adjacent countries.

The need for nurseries ought to be stressed more at this point so as to bring to the attention of many parents, the degraded social condition their children are liable to face if further negligence of such prospects is continued. This need may be summed up in the following major points:

1. The physical dangers and deteriorating influences of street life. The example mentioned earlier explains this aspect very well.
2. The high rate of child diseases and mortality.
3. General ignorance of the requirements of good parenthood.

4. Crowding of the infants in schools with children of pre-school age and complete unsuitability for such youngsters of these schools with their bad ventillation, lack of hygienic conditions and premature drilling in the different fields.

II. WHAT IS A NURSERY SCHOOL

A good nursery school is not a "parking place" that takes little two to five-year olds away from their parents. It is an educational institution providing continuous educational experience to a number of kids gathered together into a family under the care of a specially trained teacher, who is to them like an elder sister, loving and understanding and helpful to each one; and also able to make for them all a happy and useful life together, without formality or rules, and yet educational in the best sense at all times.

The following are some of the ways of distinguishing a good nursery school.

1. A good nursery school has ample indoor and outdoor space.
2. A good nursery school maintains safe, sanitary and hygienic housing conditions.
3. A good nursery school protects and promotes the child's health.
4. A good nursery school provides appropriate and sufficient equipment and play materials for the child's growth.
5. A good nursery school has enough teachers both to guide group living and to take care of individual children's needs.
6. In a good school a child is helped to gain increasing power and facility in the use of language, paints,

clay, blocks and other constructive material to express his understanding of ever-widening experiences. These experiences are provided by first-hand contacts with his environment within the school and his neighborhood.

He is seldom shown or told what to make, but is encouraged to use materials creatively.

7. A good nursery school helps children to develop wholesome attitudes toward their own bodies and bodily functions.
8. A good nursery school provides real opportunities for the child's social adjustment.
9. Because yound children are so closely linked with their fathers and mothers, a nursery school considers parents as well as children.
10. The teacher in a good nursery school is well adjusted. She realizes that human feelings are important, so she herself expresses feeling and encourages the expression of feeling in children.
11. A good nursery school has teachers who understand children and how they learn.
12. A nursery school not only pays attention to what a child does, but considers why he does it and how to help him.
13. In a good nursery school the children are observed, and notes or records are made on their progress and development. They are used to help both teachers and parents to clearer vision of the

children and to a better evaluation of their needs, and also serve as guides to wiser procedures.

14. In a good nursery school the program considers the varying needs of the entire family with special responsibility for the growth and protection of the child himself.
15. The nursery school recognizes the importance of regularity in the lives of young children but "routines" are not overstressed.
16. Because the entire nursery school staff has a direct or indirect influence on each child, each member tries to work in accordance and in sympathy with one another.
17. The good nursery school uses all available community resources and contributes to joint efforts for community betterment.

The ages of children in the nursery school are from two to five, sometimes to six, for it is considered unwise to begin formal academic work before the children are mature for it; this maturity is reached usually in the sixth year. Children between these ages need companionship both of older and younger children, for, by being with others and by imitating others, will learn, as well as perceive.

The nursery school provides continuous health supervision and nurture which is an essential preventive of weakening childrens diseases and makes for the promotion of a vigorous healthy childhood. Thus, it will help the

mother to enjoy her child from every aspect of living and to be enjoyed by him when they are together. It further provides a happy, natural environment in which all sides of a young child's development receive careful and continuous attention but always in close touch with home life. Many families could be found who will testify to the truth of this, and many parents may be found seeking this very opportunity for their yound children, but the sad thing about it, is that the number of nurseries existing in Lebanon is not very widely spread over the country to supply the needs of parents with young children. Therefore, it is in the power of the local education authority to establish nursery schools. Some such schools, as has been mentioned earlier, may be voluntary, i.e. owned and maintained by private philanthropies.

The nursery school receives children direct from their homes of all types. Even if chronologically of the same age, these children are in varying stages of development. It is for most of them their first experience of society outside the home circle, and an environment should be provided in which their own individualities are free to develop within the give and take of a new community.

III. AIM OF A NURSERY SCHOOL

The nursery school must be looked upon not as a convenience for parents, but rather as a necessary adjunct to child care and training. It is an additional aid for helping the mother and father to prepare their children for a healthy and efficient way of living, and not a substitute for a home. It is neither for the privileged nor for the under-privileged, but for both. "The nursery school is not a luxury but a necessity."

It is necessary for a child to have an opportunity of attending a well-run nursery. Adults have many opportunities provided by the community, such as libraries, museums, zoos, theaters, etc., but the two to five years old can make little or no use of these. During the first two years of life, the home is for sure the best place for the child. From the age of two onwards, the child having become a social being, parents require the facilities of a nursery school, mainly for security, comfort, cooperation, and exploration of the child through his varied activity and experience.

V. ANALYSIS OF PROBLEM

A. Site Location

To start a nursery school, one should first collect all the facts and information showing the desirability for opening such a school in any particular neighborhood. These include the need of and benefit to young children of a nursery school, ways and means of raising sufficient money to defray the expenses of the building and maintenance, grants to be obtained after school proves efficient. Once these are procured, a suitable site for a scheme is to be chosen.

Usually, nurseries are located in the center of the neighborhood where they will be within reach by most of the residing families. In fact there is no rule that restricts the location to a certain area. Sometimes, it is preferable to have them outside the city if a suitable and adequate lot is not available in the proper place. For this project, the subject matter of this report, a convenient site was picked for the purpose. It falls in the heart of Ras Beirut residential quarter and is reached by the 78th dead-end street that branches from de Lyon Street, one of the most important roads in the vicinity. This makes it a quiet place free from concentrated and noisy traffic. The land is rectangular in shape and covers about 2750 square meters with a 45 meters frontage on the road.

An alternative to this site was first selected on the Corniche of Ras Beirut, but was later given up because it was too exposed to the alternating sea weather to which small children may not get adapted, thus affecting their health.

B. Considerations in Planning

"We shape our buildings and afterwards our buildings shape us." This famous remark of Mr. Winston Churchill is particularly true in the case of school buildings.

It is very well understood that the simpler and more homelike the nursery building, the better. The need for space, light, sun and air, for good storage, space for school stock, toys and childrens' possessions was provided for.

The specific shape given to the school resulted after a thorough study of all schooling and housing conditions that are a direct effect on the children's health and being. Since the road on the west side of the school is only eight meters wide, and to avoid overcrowding of cars, parking within for parents and school needs was provided for within the spacious land allotted for the school site. The rest of the land was left for a small farm for keeping pet animals like dogs, cats, rabbits, geese, etc., and a wide, open, sunny but protected playground to provide ample play room for the kids.

The interior planning is more like a home, where teachers could observe the behavior of young children

in all their daily activities, such as playing, eating, sleeping, and their relations with other children.

The most important unit or room in any nursery school is the multi-purpose room, the center of all activity, and since the school will operate during the winter season only, this room will be used most of the time. It is a self-contained unit including facilities for indoor play. Ideally, the room should be sunny and for this reason, windowheads were carried clear to the ceiling thus chasing away shadows and giving a sense of space. The south facade was so treated with glass inorder to admit the maximum view of the "outdoors" with their pleasant scenes, yet admitting no glare. This entailed the use of double overhang to reduce light reflectivity. Direct contact to outdoor play area is very essential since supervision is a necessity.

The multipurpose room was given its full value and was placed in the best or most central position. Circulation through the room from one area of the building to another was logically worked out to avoid confusion, and since this room is usually noisy, it was segregated in a way from the rest.

The value of ample space and the part that it plays in good design, is well illustrated in the different units of the school, especially, in the recreation room. No room can look its best if it is overcrowded with people and furniture and the contribution to comfort and appearance made by the right use of space, is a

factor of extreme importance.

The cloakrooms in the multi-purpose room and the adjacent toilets with hot water and shower baths, are light and warm and so equipped as to enable the child to proceed with his toilet at his natural, rather slow pace. Most of the furniture and toilet fixtures are child size.

"The trend in planning, of which Neutra has been one of the foremost exponents, which envisages the multi-purpose room as a 'laboratory where children can learn by experiment' is, for this country a new departure of the utmost importance. It provides freedom of activity, the work area being made flexible in size by the introduction of light, movable furniture, including cabinets and cupboards."

C. Materials of Construction

Walls: hollow concrete blocks set in cement mortar.

Ceilings: reinforced concrete - ribbed construction.

Flooring: polished terrazzo cement tiles.

Wall linings for kitchen, pantry, baths and W.C.'s:

glazed porcelain tiles 15 cm x 15 cm.

Plaster for external and internal use:

cement, slaked lime and sand.

Shuttering and forms: timber.

Water proofing: asphalt.

Internal doors: Swedish pine or katrani.

External doors and windows:

iron or steel ready-made sections.

Glazing: 3 mm. clear glass (double).
5 mm. plate glass in large areas.

Sanitary ware furnishings: "Twyford" or equal.

Drainage pipes: glazed earthen ware or local cement pipes or cast iron pipes.

Heating: panel heating with 3/4" coils embedded in floor.

Paints and color washes: best quality - factory mixed color washes in distemper.

Iron mongery: best quality available on the market.

D. Constructional Design

One storeyed building of light reinforced concrete skeleton type of construction was selected. Steps were avoided as much as possible because kids under five are, as a rule, unaware of them. The one-storeyed building permits light to enter from both sides of a room and this in turn makes larger rooms possible. The uses to which they can be put are also numerous.

Construction is made flexible and this is achieved by abandoning the traditional weight-bearing wall in favor of a framed construction, where the loads are carried by a structural frame or skeleton of concrete, and where the wall panels receive no loading or stress. This type of construction has proved lately to withstand earthquakes better than weight-bearing walls. The wall panels, thus, can be treated as free individual partitions and their position altered at will.

The need for flexible planning is further emphasized by the necessity for exceptional speed in execution and

economy in building materials and labor in improving any deficiencies in accommodation.

The necessity for making allowance in all plan-lay-outs should be repeatedly emphasized. If this is not done at the same time as the layout of the building, there will be a strong tendency for extension at the expense of playgrounds, the importance of which has been stressed before, and to prevent future encroachments on the playing space accommodation, the original site was so adapted as to allow sufficient margin for extensions to cope with the increased number of pupils.

It is true that an architect when designing a building, has to fulfil certain requirements imposed upon him by his client although allowances for future alterations in standards of accommodation are seldom rejected by the client.

The grid system was not followed in this project since it is a necessity to adapt the site to the building and not the building to the site.

E. School Equipment

The educational material and equipment necessary for both outdoors and indoors, from tables to lavatories, are so designed that the children can look after themselves with the minimum of assistance. This promotes responsibility, self esteem and self reliance. All the school material is designed and chosen to help the physical, mental, and emotional development of the children; this includes the extremely important primitive and basic raw materials like water, sand, earth,

clay and paints, as well as dolls, bricks, and push-and-pull toys. Such toys increase confidence in the child and exercise his physical powers. Objects used indoors are arranged in their proper places, each with its appropriate sign or label so that each child knows his own from the beginning, thus giving him a feeling of security, tending to develop a spirit of independence.

The nursery school will have some interior decorations, partly of the children's work. A few low tables will be provided with as many low chairs as are needed. Simple, plain rugs will be spread on the floors in the winter.

Around the room, wall closets and cabinets are installed for keeping children's clothes, play materials and other belongings of both the pupils and the teacher. In one corner, there will be a piano on which music can be played by the teacher and songs heard from the kids. This will give them the beginning of group work. A small wooden platform on which the children can do some acting or recitation, is also a necessity.

In the dining room, there are three big but low tables with chairs according to the number of children and a small one for eating materials, napkins, etc.

The sleeping siesta rooms, have very low beds with some sort of covering. Pictures are hung on the walls in most of the rooms showing views of birds, children, animals, flowers, houses, boats, etc.

In the toilet room, the water-closets, wash-basins,

and showers are low enough to enable the children to use them easily. Small mirrors are hung over the wash-basins, through which the children can look while combing their hair. The rest of the toilet room should be adapted in its equipment to the size best used by the child. Low hooks for hanging their towels on and low cases or holes in the wall for putting in their combs and toothbrushes which they will be taught how to use, will also be installed.

The offices are equipped with a desk, chairs, closets, hangers and cabinets, mostly built in. Immediate visual control of the surroundings is important on the part of the teacher. This is helped by providing glazed doors and partitions for the offices to facilitate supervision.

The rest of the rooms are of less importance being mainly for service, maintenance and storage purposes.

It does no harm to list hereunder the essential equipment of a nursery school:

1) Training Equipment:

(a) Ladders - stationary ones preferable.

(b) Boards or planks of wood for walking on together with their boxes on which they are placed forming bridge.

(c) Wagons, wheel-barrows, motor and kiddie cars.

(d) Rope swings with wooden seats and a swing boat.

(e) Gallery and slide.

(f) Wooden blocks with hammers and rails.

(g) Jumping ropes, wooden horses and hammer pegs.

(h) See-saw about 6 feet long, 5-9 inches wide and 14 inches high.

(i) Balancing beam, about 7 feet long, 3 inches deep. Width that of a child's foot.

(j) Sand-box with a pie-mud corner, equipped with spoons and pans.

(k) Jumping steps, climbing frame.

2) Equipment for indoor play:

Blackboard; crayons; pencils and paper; blunt scissors; bubble pipes; clay or plasticine; blocks; cars; wooden engines; play animals; dolls; tables and chairs; beds; cradles and clothes; broom; duster; pans; wash tub; etc.

3) Equipment for quiet moments:

Books; cartoons; ryhmes; picture puzzles; blocks for design. Pet animals may be brought in but they should live outside in the yard in housing quarters of their own.

F. Daily Program of School

The proposed nursery school will be on a rather full-day program, from 9:00 o'clock in the morning to 3:30 in the afternoon. Programs consist primarily of supervised play, rest, and diet. Pupils are also orderly trained in control of their bodies, in dressing themselves, in independent and inter-dependent activities.

The following is a daily program for a nursery class of two to five years of age:

9:00 Child brought to school, puts away outdoor clothing in cloakroom, and gets ready to start the day fresh.

9:15 Inspection by teacher - attendance recorded.

9:30 "Free play" period either outdoors or indoors according to weather or gardening.

10:15 a) Putting away toys

b) Toilet routine

c) Story and exchange of news

10:30 a) Mid-morning nourishment (milk, orange joice plus biscuits).

b) Washing routine

11:00 a) Indoor "free play" period. Children select their own play materials.

b) Organized program i.e. story period, dramatizing, conversations or music period - singing, marching or rythmic practice.

11:45 Putting away toys; tidying of playroom, washing and getting ready for lunch.

12:15 Dining room routine. Children directed to their places. Meal is preceded by grace.

12:45 Toilet routine.

12:30 "Sleeping routine". Children sleep or rest on stretcher beds in the siesta rooms for a period varying from 3/4 to 1 1/2 hours.

2:00 "Free play" outdoors.

2:30 Mid-afternoon refreshments.

2:45 Dressing routine. Each child proceeds to the cloakroom and to his locker, puts on his outdoor clothing with or without help.

3:00 Story.

3:3 0 Parents start calling for their children, or a car is arranged to take them home.

VI. CONCLUSION

The existence of nursery schools at all times cannot be dispensed with. During war, for instance, women may be called into industry, as is the case in Europe, and close attention will have to be paid to nursery schools. It is hoped thus, that this project will set the keystone for future fine prototypes. It will give joy to all parents to think that something is being done for the good of their children but most important, it will give joy to the children themselves, for they are the ones to develop into good, healthy and useful citizens of the future, for "the child of today is the father of tomorrow."

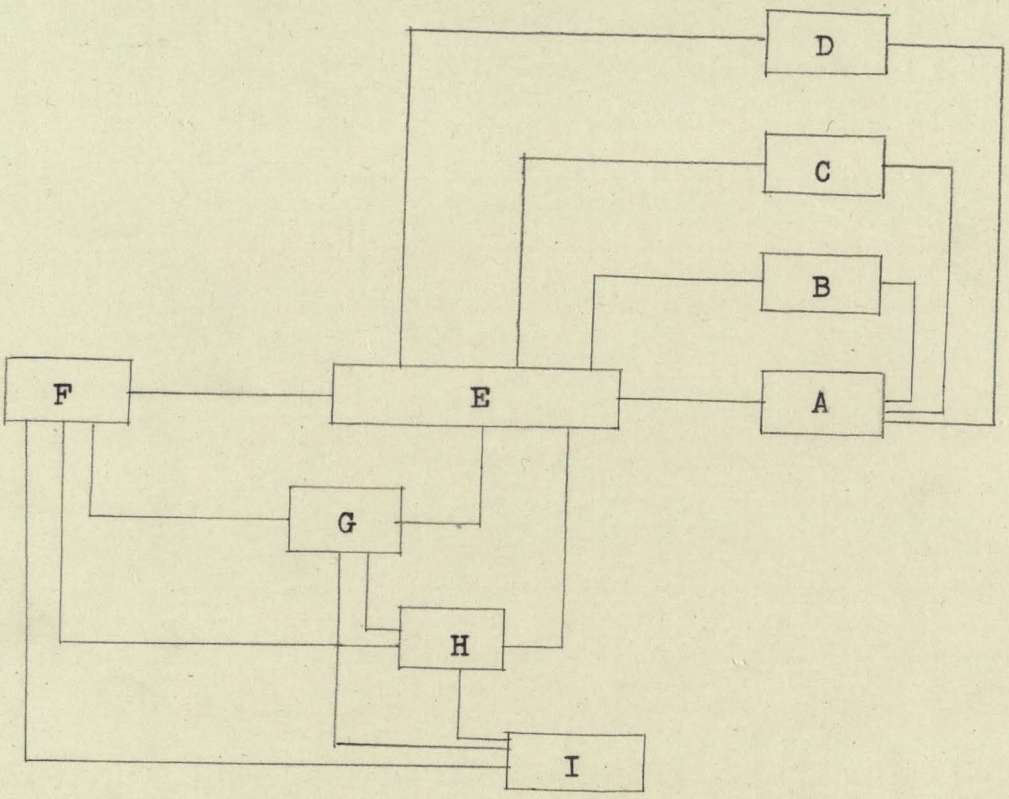
Nursery schools help develop in the children a dawning social intelligence and thus will be laid the foundation for sure development of the will to cooperate and the capacity for successful community living in later years.

It is finally deduced that educating young children depends on two main institutions, namely, the home and the nursery school. One cannot be separated from the other. Parent education goes hand in hand with nursery school education and, to keep this process uninterrupted, nursery schools cannot be avoided for they provide those educational opportunities that can help both children and parents to happier living. The teacher is a parental aid and provides another pair of hands to make the task of raising pleasant

and efficient children.

The young must be looked upon as a precious thing for "youth is a property of the living world."

VI. FLOW DIAGRAM OF SCHOOL



A - Lounge

B - Offices

C - Toilets

D - Janitor room

E - Multipurpose room

F - Toilets

G - Siesta rooms

H - Dining room

I - Kitchen

VII. STRUCTURES DESIGN

Specifications

Weight of concrete	=	2.5 T/m^3
Weight of 25-cm blocks	=	1.4 "
Allowable soil pressure	=	3 Kg/cm^2
f'_c	=	60 "
f_s	=	1300 "
$V_{max.}$	=	15 "
v	=	3-4 "
u	=	6.5 "
n	=	15 "
K	=	10.8 "
k	=	0.41 "

DESIGN OF RIBBED FLOOR SLAB

Loads:

L.L.	= 100	Kg/m^2
Blocks 14 x 10	= 140	Kg/m^2
Concrete 0.10 x 2.5	= 250	"
Plaster finish etc.	= 40	"
Total load /2 ribs	= 530	Kg/m^2
Total load /1 rib	= 265	Kg/m

Check for Shear:

$$V = \frac{wl}{2} = \frac{265 \times 3.30}{2} = 440 \text{ Kg}$$

Max. allowable shear = 3 Kg/cm^2

$$d = \frac{V}{vjb^1} = \frac{440}{3x7/8x10} = 16.7 \text{ cm}$$

Furnished d = 20 - 3 cm = 17 cm

$$v = \frac{V}{djb^1} = \frac{440}{17x7/8x10} = 2.9$$ safe-no need for web reinforcement

For Center and Support:

$$M = \frac{1}{10} wl^2 = \frac{1}{10} \times 265 \times (3.3)^2 = 288 \text{ Kg-m} = 28800 \text{ Kg-cm.}$$

Steel Area:

$M_1 = Kbd^2 = 10.8 \times 10 \times (17)^2 = 31200$ Kg-cm.

Since 31200 > 28800, we do not need compression steel.

$$A_s = \frac{M}{f_s(d-t/2)} = \frac{28800}{1300\ (17-3)} = 1.6 \text{ cm}^2$$

Therefore USE 1 Ø 16mm. bar. $A_s = 2.03$ cm^2

Check for Bond:

Allowable = 6.5 Kg/cm^2

$$u = \frac{V}{Eojd} = \frac{440}{5x7/8x17} = 5.9 \text{ Kg/cm}^2.$$ ∴ Satisfactory

NOTE: The ribbed slab designed above will extend 60 cm. from one side and 140 cm. from the other both resting on the cantilevered beams that extend from B-1.

DESIGN OF BEAM B-1

Loads:

Uniform load from slab = 4 x 440 = 1760 Kg/m.

D.L. of stem (assumed) = .30 x .40x1x2500 = 300

Total .... = 2060 Kg/m.

$V = \frac{wl}{2} = \frac{2060x7}{2} = 7200$ Kg.

$b^1d = \frac{V}{vj} = \frac{7200}{4x718} = 2050\ cm^2$

If b^1 = 30 cm, d = 53 cm. 53 + 6cm (cover for 2 rows)-2

= 39 cm stem. O.K.

$v = \frac{V}{b^1dj} = \frac{7200}{30x53x7/8} = 5.18\ Kg/cm^2$

3 v 15 Kg/cm^2 Therefore we need web reinforcement.

For Center and Supports:

$M = \frac{1}{10}wl^2 = \frac{1}{10}(2060)(7)^2 = 10{,}100$ Kg-m

= 1,010,000 Kg-cm

$As = \frac{M}{fs\ (d - t/2)} = \frac{1010000}{1300(53-10)} = 18\ cm^2$

Therefore USE 6 Ø 20 m/m bars in two rows. As = 18.84 cm^2

$M_1 = kbd^2 = 10.8 \times 30x(53)^2 = 910{,}000$ Kg-cm

Since M_1 M, we need compressive steel.

$M_2 = M - M_1 = 1{,}010{,}000 - 910{,}000 = 100{,}000$ Kg-cm.

$As_1 = \frac{M_1}{fsjd} = \frac{910{,}000}{1300x7/8x53} = 15.1\ cm^2$

$As_2 = \frac{M_2}{fs(d-d^1)} = \frac{100{,}000}{1300x(53-3)} = 1.54\ cm^2$

$As = As_1 + As_2 = 15.1 + 1.54 = 15.64 cm^2$

$A^1_s = \frac{As_2}{2}\left(\frac{1 - K}{K-d^1/d}\right) = \frac{1.54}{2}\left(\frac{1-0.41}{0.41-3/53}\right) = 8\ cm^2$

Placement of Steel:

A_s = 15.64 cm^2 USE 3Ø20 which are furnished by the bent up bars

2Ø20 to give a total A_s = 15.70 cm^2

$A^1_s = 8\ cm^2$ Therefore USE 3Ø20. $A_s = 9.42\ cm^2$

These are furnished by the 3Ø20 bars that remained straight.

Shear:

$$V = \frac{wl}{2} = \frac{2060 \times 7}{2} = 7200\ Kg$$

$$V_c = vjbd = 3 \times \frac{7}{8} \times 30 \times 53 = 4170\ Kg$$

$$V^1 = V - V_c = 7200 - 4170 = 3030\ Kg$$

$$x = \frac{V^1}{w} - = \frac{3030}{2060} = 1.47\ m$$

Therefore USE stirrups to a distance of 1.5 m.

Spacing $S = \frac{Avf_{rjd}}{V^1}$

$$S\ max = \frac{d}{2} = \frac{53}{2} = 26.5\ cm.$$

Using Ø 6m/m stirrups

$$S = \frac{(2 \times 0.28)\ 1300 \times 7/8 \times 53}{3030} = 11.5\ cm.$$

Therefore USE Ø 6 m/m stirrups at 11.5 cm cc.

Bond:

$$U = \frac{V}{Eojd} = \frac{7200}{31.5 \times 7/8 \times 53} = 3.45\ Kg/cm^2$$

This is safe since allowable is 6.5 Kg/cm^2.

DESIGN OF CANTILEVERED BEAM B-2

Load from slab = 4 x 440 = 1760 Kg/m.

D.L. of stem (assumed) = 0.30x0.20x1x2500 = 150

Total ..... = 1910 Kg/m.

$V = \frac{wl}{2} = \frac{1910 \times 1.40}{2} = 1340$ Kg.

$b^1d = \frac{V}{vj} = \frac{1340}{4 \times 7/8} = 480$ cm^2

If $b^1 = 30$ d = 16 + 3 cm cover = 19 Therefore O.K.

$V = \frac{V}{b^1dj} = \frac{1340}{30x17x7/8} = 3.00$ Kg/cm^2

2.55 = 3 Kg/cm^2 Therefore there is no need for web reinforcement.

At the Support:

$M = \frac{wl^2}{2} = \frac{1910 \times (1.4)^2}{2} = 1870$ Kg-m = 187,000 Kg-cm.

$A_s = \frac{M}{f_s jd} = \frac{187000}{1300x7/8x\ 17} = 7.4$ cm^2

USE 3 ø 20 m/m bars. $A_s = 9.42$ cm^2

These are furnished by the 3 ø 20 m/m bars that are bent up from B-1.

$M_1 = Kbd^2 = 10.8\ (30)(17)^2 = 93,800$ Kg-cm

Since M_1 M, we need compression steel.

$M_2 = M - M_1 = 187,000 - 93,800 = 93,200$ Kg-cm.

$A_{s1} = \frac{M_1}{f_s jd} = \frac{93,800}{1300x7/8x17} = 4.85$ cm^2

$A_{s_2} = \frac{M_2}{f_s(d-d^1)} = \frac{93,200}{1300(17-3)} = 5.15$ cm^2

$A_s = A_{s1} + A_{s_2} = 4.85 + 5.15 = 9.90$ cm^2

$A^1_s = \frac{A_{s2}}{2} \left(\frac{1-K}{K-d^1/d}\right) = \frac{5.15}{2} \left(\frac{1-0.41}{0.41-3/17}\right) = 5.5$ cm^2

Placement of Steel:

A_s = 9.9 cm^2 Since 3 ∅ 20 m/m bent bars from B-1 and 2 ∅ 20 m/m supplements also from B-1 furnish a total of 15.70 cm^2, the area is abundant.

A^1_s = 5.5 cm^2

USE 2 ∅ 20 m/m bars. A_s = 6.28 cm^2

Shear:

V = 1340 Kg.

V_c = vjbd = 3 x 7/8 x 30 x 17 = 1340 Kg.

V^1 = $V-V_c$ = 1340 - 1340 = 0

Therefore we do not use stirrups.

USE ∅ 6 m/m ties every 15 cm.

Bond:

$$U = \frac{V}{Eojd} = \frac{1340}{21.4 \times 7/8 \times 17} = 4.2 \text{ Kg/cm}^2$$

O.K. since allowable = 6.5 Kg/cm^2

DESIGN OF COLUMN C-1

Load from beam 7200 + 1340 = 8540 Kg.

Weight of column = 0.2x0.2x3.5x2500 = 350 Kg.

Total ..... = 8890 Kg.

Slenderness ratio $= \frac{H}{a} = \frac{350}{20} = 17.5$

Where H = height of column

a = minimum dimension of column section.

for a value of 17.5 $f_c = 52.3$ Kg/cm^2 "DUNOD HANDBOOK"

Area $= \frac{1.15\ P}{(1+0.005n)r_1}$

Where P = total load

n = 15

$r_1 = f_c$

$A = \frac{1.15 \times 8890}{1.075 \times 52.3} = 182$ cm^2

Therefore USE the minimum SIZE of column 25 cm x 25 cm

Assume steel section = 0.1 % A

$A_s = 625 \times 0.01 = 6.25$ cm^2

USE 8 ϕ 10 m/m bars $A_s = 6.28$ cm^2

Stirrups:

$S = \frac{3}{4} a = \frac{3}{4} \times 25 = 18.75$ cm.

USE 6 m/m ties at 20 cm cc.

DESIGN OF BELT BEAM B-3

Load from 25 cm concrete blocks = 0.25x3.5x 1x1400= 1225 Kg/m

D.L. of beam (assumed) = 0.30x0.30x1x2500= 225 "

Total ..... = 1450 Kg/m

$V = \frac{wl}{2} = \frac{1450 \times 3.30}{2} = 2400$ Kg.

$b^1d = \frac{V}{vj} = \frac{2400}{3x7/8} = 915$ cm^2

If b^1= 30cm d = 30.5 - 6 cm cover = 24.5 cm. ∴ O.K.

$v = \frac{V}{b^1dj} = \frac{2400}{30 \times 24.5 \times 7/8} = 3.7$ Kg/cm^2

$M = \frac{1}{10} wl^2 = \frac{1}{10}(1450)(3.3)^2 = 1580$ Kg-m = 158,000 Kg-cm.

$A_s = \frac{M}{f_s jd} = \frac{158000}{1300x7/8x24.5} = 5.67$ cm^2

USE 5 ∅ 12 m/m bars $A_s = 5.65$ cm^2

$M_1 = Kbd^2 = 10.8x30x(24.5)^2 = 195000$ Kg-cm

Since M_1 M we need no compression steel.

Shear:

V = 2400

$V_c = vjbd = 3 \times 7/8 \times 30 \times 24.5 = 1930$ Kg.

$V^1 = V - V_c = 2400 - 1930 = 470$ Kg.

$x = \frac{V^1}{w} = \frac{470}{1450} = 0.3$ m.

$S = \frac{A_v f_v jd}{V^1} = \frac{(2x0.28)1300 \times 7/8 \times 24.5}{470} = 33$ cm.

$S_{max} = \frac{d}{2} = \frac{24.5}{2} = 12$ cm.

Therefore USE ∅ 6 m/m stirrups at 12 cm cc. for 36 cm.

Bond:

$U = \frac{V}{E_o jd} = \frac{2400}{19 \times 7/8 \times 24.5} = 5.9$ Kg/cm^2 ∴ Safe.

DESIGN OF BELT BEAM B-1

No partitions rest on this beam

L.L. = 100 Kg/m^2 = 100 x 7 = 700 Kg/m

Beam 30 cm x 30 cm = 225 Kg/m

Total ..... = 925 Kg/m

$V = \frac{925 \times 7}{2} = 3240$ Kg.

$b^1 d = \frac{3240}{4 \times 7/8} = 925$

$b^1 = 30$ d = 30.8-6 = 24.8 cm. Therefore O.K.

$v = \frac{3240}{30 \times 24.8 \times 7/8} = 5$ Kg/cm^2

Therefore we need web reinforcement.

$M = \frac{1}{10}(925)(7)^2 = 5440$ Kg-m = 544,000 Kg-cm

$A_s = \frac{544000}{1300 \times 7/8 \times 24.8} = 19.3$ cm^2

USE 6 ∅ 20 m/m $A_s = 18.84$ cm^2

$M_1 = 1018 \times 30 (24.8)^2 = 199{,}000$ Kg-cm.

$M_2 = 544{,}000 - 199{,}000 = 345{,}000$ Kg-cm.

$A_{s1} = \frac{199000}{1300 \times 7/8 \times 24.8)} = 7$ cm^2

$A_{s_2} = \frac{345{,}000}{1300(21.8)} = 12$ cm^2

$A_s = 7 + 12 = 19$ cm^2

$A^1_s = \frac{12}{2}\left(\frac{0.59}{0.29}\right) = 12.2$ cm^2

Placement of Steel:

$A_s = 19$ cm^2 USE 6 ∅ 20m/m bars. i.e.add 3 ∅ 20 to the bent up bars. $A_s = 18.84$ cm^2

$A^1_s = 12.2$ cm^2 USE 4 ∅ 20m/m bars by adding 1 ∅ 20m/m as supplement. $A^1_s = 12.56$ cm^2

Shear:

$$V_c = 3 \times \frac{7}{8} \times 30 \times 24.8 = 1955 \text{ Kg.}$$

$$V^1 = 3240 - 1955 = 1285 \text{ Kg.}$$

$$x = \frac{1285}{925} = 1.4 \text{ m.}$$

$$S = \frac{(0.56)(1300)7/8 \times 24.8}{1285} = 12.5 \text{ cm.}$$

$$S_{max} = \frac{24.8}{2} = 12.5$$

Therefore USE ϕ 6 m/m stirrups at 12.5 cm cc. for 1.5 m.

Bond:

$$U = \frac{3240}{37.8x7/8x\ 24.8} = 3.95 \text{ Kg/cm}^2 \quad \therefore \text{ O.K.}$$

DESIGN OF FOOTING UNDER COLUMN C-1

Load from column C-1 = 8890 Kg

" " belt beam 2(B-3) = 4800 "

" " " " B-1 = 3240 "

Total ..... =16830 "

Assume weight of footing

= 5% of column = 840 "

Total load acting =17670 "

Allowable soil pressure = 3 Kg/cm^2

Therefore bearing area of footing = $\frac{17,670}{3}$ = 5890 cm^2

USE a 77 cm x 77 cm footing.

Net upward pressure = $\frac{16,830}{5890}$ = 2.86 Kg/cm^2

M_{max} = PA x (arm)

= $2.86 \times 77 \times 26 \times \frac{26}{2}$ = 74,400 Kg-cm.

$M = Kbd_1^2$

$d_1 = \sqrt{\frac{M}{Kb}} = \sqrt{\frac{74400}{10.8 \times 77}}$ = 9.5 cm.

$V_s = A_p = (\frac{77 + 44}{2})(16.5)(2.86)$ = 3100 Kg.

$d_2 = \frac{V_s}{vjb} = \frac{3100}{4 \times 7/8 \times 44}$ = 20.5 cm.

$d = \frac{d_1 + d_2}{2} = \frac{9.5 + 20.5}{2}$ = 15 cm.

$V_s = (\frac{77 + 55}{2})(11)(2.86)$ = 2080 Kg.

$d = \frac{2080}{4 \times 7/8 \times 55}$ = 10.8 cm < 15 cm. ∴ O.K.

USE d = 20 cm + 7 cm cover = 27 cm.

$A_s = \frac{0.85\ M}{f_s jd} = \frac{0.85 \times 74400}{1300 \times 7/8 \times 20}$ = 2.78 cm^2

Bond:

$V_b = 0.85\ A_p = 0.85 \times 77 \times 26 \times 2.86 = 4870$ Kg.

$E_o = \frac{V}{ujd} = \frac{4870}{6.5 \times 7/8 \times 20} = 42.8$ cm.

USE 10 ∅ 14 m/m bars $A_s = 15.39\ E_o = 43.99$ cm.

Dowels extend into the column for each bar of column 26.7 bar diameters. i.e. $26.7 \times 1 = 26.7$ cm.

Working value (bar force) of one column bar $= 0.8\ f_s\ A_s$

$f_s = \frac{2.78}{15.39} \times 1300 = 235$ Kg/cm^2

$0.8 \times 235 \times 0.78 = 146.5$

Length by which dowel has to extend into the footing

$= \frac{0.8 f_s A_s}{\text{Mx Perimeter}}$

$l = \frac{146.5}{6.5 \times 3.14} = 7.2$ cm.

This length can be accommodated within the 20 cm available in the footing so that no pedestal is required.

Bearing Stress is:

$\frac{16,830}{77 \times 77} = 2.84$ Kg/cm^2

Allowable = 3 Kg/cm^2

Therefore it is Safe.

VIII. ILLUMINATION DESIGN

Lumen method of design of interior lighting systems

$$Kr_1 = \frac{2hc\,(w+l)}{3wl}$$ for indirect systems

$$Kr_2 = \frac{hs\,(w+l)}{wl}$$ " direct systems

Where Kr = room coefficient

hc = height of ceiling above working plane

hs = height of sources above working plane

w,l, = width and length of room, respectively.

Design of Multipurpose Room

l = 10m. w = 7m. h = 3.5 m.

E = 30 ft.c. ("ILLUMINATION ENGINEERING" Table 10.1)

Type 6 luminare that distributes 58% of lamp flux downward and 5% upward

hc = 3.5 - .5 = 3 m.(working plane 0.5m above floor)

hs = 3.5 - 0.5 - 0.5 = 2.5 m (Luminares suspended 0.5 m. from ceiling)

$$Kr_1 = \frac{2 \times 3(7+10)}{3 \times 7 \times 10} = 0.486$$

$$Kr_2 = \frac{2.5(7+10)}{7 \times 10} = 0.608$$

Weighted room coefficient is:

$$Kr = \frac{5}{63}(0.486) + \frac{58}{63}(0.608) = 0.5985$$

$$\text{Room index} = \frac{1}{0.5985} = 1.67$$

Ku = 0.44 (by interpolation from table 11.4).

$$\phi L = \frac{EA}{NKuM}$$

Where ØL = initial lumens per lamp (lumens) = ?

E = maintained average illumination = 30 ft-c.

A = area of room = 30.5' x 23'

N = total number of lamps = 6 lamps

Ku = coefficient of utilization = 0.44

M = maintenance factor = 0.70 for good conditions

$$ØL = \frac{30 \times 30.5 \times 23}{9 \times 0.44 \times 0.70} = 7{,}600 \text{ lumens}$$

Therefore USE 6,300-watt incandescent type 6, lamps.

Other characteristics of these lamps are found in table 9.1 of "ILLUMINATION ENGINEERING".

Spacing of luminaires

$\frac{10}{3} = 3.3$ m.

$\frac{7}{3} = 2.3$ m.

Therefore proper uniformity of illumination will result.

Test for Quality of Illumination - In accordance with the recommendations of the "IES LIGHTING HANDBOOK".

$$E = \frac{ØLNKuM}{A} = \frac{5900 \times 9 \times 0.44 \times 0.70}{30.5 \times 23} = 22.8 \text{ ft-c.}$$

Type of lighting - direct

$$\text{Room coefficient} = \frac{h(l+w)}{2wl} = \frac{3.5(10+7)}{2x7x10} = 0.425$$

Average reflectance = $P_t = 0.70$, $P_t = 0.30$

$P_w = 0.50$, $P_c = 0.75$

Brightness = E x f_t or A or B or C (table 9-8)

Where E = maintained illumination

f_t = task relectance

$$A = \frac{\text{Average wall brightness (midway between fl. \& c)}}{\text{Average illumination at work plane}}$$

$$B = \frac{\text{Average ceiling brightness}}{\text{Average illumination at work plane}}$$

$$C = \frac{\text{Average floor brightness}}{\text{Average illumination at work plane}}$$

Brightness:

Task = E x f_t = 22.8 x 0.7 = 15.9 ft-lamberts

Walls = E x A = 22.8 x 0.215 = 4.9 " "

Ceiling = E x B = 22.8 x 0.1885 = 4.3 " "

Floor = E x C = 22.8 x 0.301 = 6.86 " "

All values fall within $\frac{1}{4}$ - 2 times that for task brightness; therefore, the quality of illumination is O.K.

IX. ACOUSTICAL TREATMENT OF SCHOOL

One important consideration of acoustical design of school buildings is the selection of site. The proposed site for the nursery school as has been mentioned earlier in this report, is a quiet one, not disturbed by traffic noise. This helps in promoting the efficiency of the pupils, as well as, their effective and constructive thinking. The noise level at the site is far below the required 70 db since the honking of automobile horns is rarely heard within about 200 meters of the site. The existing buildings and trees around the plot help a great deal in reducing the noise level.

In general, treatment of the ceilings of the different rooms and corridors with absorptive material is sufficient for such a nursery school which contains no rooms and halls like gymnasiums, lecture halls, language and music rooms, wood and metal workshops, laboratories, etc., all of which require thorough acoustical designing. The multipurpose room is perhaps the only room that needs treatment of the walls and ceilings. These interior surfaces may consist of lining materials attached to the structure, or they may be part of the structure itself. The ceiling may be either treated with 20 cm x 20 cm acoustic tiles which are very common in schools, especially in classrooms, or panelled with fibre board, and the walls partly lined with wood.

X. HEATING AND VENTILATION

Panel heating is the system used in the nursery school. It is a method of introducing heat to rooms in which the emitting surfaces are usually completely concealed in the floor, walls, or ceiling. The heat is disseminated from such panels partly by radiation and partly by convection, the relative amounts depending on the panel location. Although ceiling panels release the largest proportion of heat by radiation, floor panels were used in the school because kids under five years old spend most of their time sitting or crawling on the floor sometimes barefooted. The fluid circulated through the pipe coils embedded in the floors is hot water. It may also be steam, air, or electricity but then different distribution units concealed in the building construction will have to be used.

Panel heating is still not introduced in Lebanon and the writer believes that once it is adopted, it will prove to be very efficient. Floor panels will find particular application in one-story buildings and basementless structures. Its cost of installation is lower than for ceiling or wall panels and greater comfort is realized in the different living and working areas with this type of heating.

Advantages of Panel Heating

1. The basic advantage claimed for a panel heating system is that of comfort, because the convective

heat loss from the human body is improved and the loss of radiation is reduced.

2. Architectural design of building is simplified by eliminating radiator recesses and ducts.
3. Use of ceiling or floor panels would permit the rearrangement of interior partitions.
4. The heating equipment would be installed as the building is being constructed, thus avoiding the need of "temporary settings."
5. Since the installation is completely concealed, tampering with fixtures and controls would be impossible. This is an advantage specially in schools and hospitals.
6. Surface discoloration would be reduced due to high temperature concentrations, that would usually cause streaking and dust deposits on walls and ceilings.
7. A lot of floor space is saved by eliminating heating fixtures of other systems.
8. The house decorator would be free to arrange the furniture in the way that pleases him. In industrial and commercial plants, freedom would be gained of arranging office equipment, machinery and the like.

The obvious objection to radiant heating would be the comparative difficulty of making changes, additions or repairs to existing installations. Also where the pipes are buried in the structure, such as the floor, there is a pronounced flywheel effect in the heating of the building.

Therefore, the system must be operated on the basis of continuous rather than intermittent heating.

Ventilation

Emphasis is laid on cross ventilation and increased window area. Since the school will not operate during the summer period, little or no use will be made of a cooling system which was, therefore, avoided.

XI. SANITARY STUDY (PLUMBING)

Plumbing has the function of furnishing water to the various parts of the school as well as removing and discharging the liquid wastes into the main sewer of the city.

The water and waste systems of the school are concentrated in two areas independent of each other. They however ultimately join in the common disconnecting and water seal trapped chamber before they discharge their liquids in the main sewer embedded in the eight-meter road at about two meters depth below the surface of the road. This road is known as the 78th Street.

For the water system, a sufficient amount of water is provided from the water main also laid in the same street, and from which one branch goes to the kitchen and girls and boys W.C.'s and lavatories. For this quarter, two water tanks, each with a capacity of not less than one cubic meter of water, are installed in the mezzanine of the kitchen. The hot water needs of the school are furnished from the hot water reservoir or cylinder installed in the boiler room situated in a central position of the basement under a part of the M.P.R.

The other branch of the main water supply goes directly to the men's and women's W.C.'s and lavatories for guests, janitor, etc. One water tank of one cubic meter capacity, is provided for this section on a "tatkheeteh" introduced in the store room.

As to the waste disposal system, quick removal of wastes with a minimum chance of stoppage or blockage of drains was assured by providing the sight fittings. Manholes, together with gulley trap adjuncts 20x20 cms., are introduced in the drainage system at intervals of ten meters maximum for easy access from both ends for cleaning purposes. They are normally 50x50 cms. with a normal depth of 60 cms. plus one per cent gradient in this case. This size will give a man enough elbow space for cleaning and/or repair purposes, when necessary. The system is ventilated by a 2 inches vent pipe in the case of sink, bath and lavatory accommodations and 4 inches vent in the case of W.C. waste disposals in order to prevent the entrance into the building of vermin and "sewer gas" or any foul air from the drainages system. The deeper the manhole the larger it should be in order to enable a man to reach down to carry out cleaning and/or repair works.

All pipes for the water and waste systems are so designed and laid to a proper gradient in order to prevent backflow of sullage water or clogging of the pipes by solid matter. The gradient given to the drainage pipes varies with the different diameter sizes of the pipes. The different sizes for the pipes, ~~shown in the plumbing~~ drains and sewers shown in the plumbing layout sheet, were selected from tables XII, XIII and XIV found in MUNICIPAL AND RURAL SANITATION by Victor M. Ehlers and Ernest W. Steel.

XII. COST ESTIMATE

In schools particularly, a great part of the cost is spent on essential services, heating and electrical installations, site works, playgrounds, etc., where the initial cost is the same whatever the class of building or shell of building may be. The importance of such things as adequate light, spaciousness and interior finish must not be forgotten.

Below is given a table showing approximately the estimated cost of the various items incorporated in the proposed nursery school.

DE - 9

No.	Description, dimensions, parts..	Unit	Quantity	Total
1.	Excavation for foundations and to make ground level; allow	lumpsum		2.500
2.	Foundations to damp proof course level; allow	lumpsum		2.500
3.	External walls - 20 cm concrete blocks at LL7.5 /M.S.	M.S.	304.60	2.285
4.	Internal walls - 10 cm concrete blocks at LL5.5 /M.S.	M.S.	394.50	2.170
5.	Reinforced concrete in ribbed slabs at LL22 /M.S.	M.S.	639.20	1.406
	Overhangs, columns at LL120/cu.m.	Cu.M.	140.00	16.800
6.	Plain Concrete floors At LL4 /M.S.	M.S.	483.30	1.930
7.	Plastering including exterior of building with 1:3:6 concrete at LL2 /M.S.	M.S.	2088.12	4.176
8.	Joinery			
	Steel windows and external walls at LL45/ M.S.	M.S.	101.65	4.574
	External Service door (katrani) at LL70 /M.S.	M.S.	3.64	255
	Internal doors (Plywood on swedish pines with logs and hardwares at LL45 /M.S.	M.S.	28.10	1.265
9.	Tiling including skirting but excluding terraces at LL7/M.S.	M.S.	452.00	3.164

No.	Description, dimensions, parts..	Unit	Quantity	Total
10.	Electric & Telephone installations at LL15 /point	Points	?	
11.	Heating system: allow	Lumpsum		5.000
12.	Plumbing & sanitary installations			
	Lavatories at LL2000 /No.	No.	4	8.000
	Kitchen at LL1000 /No.	No.	1	1.000
13.	Finishing work: allow	Lumpsum		1.000
14.	Decoration allow	"		2.000
15.	Roofing allow	"		3.000
16.	Playgrounds allow	"		5.000
	Estimated Total			62.025

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XIV. LIST OF DRAWINGS

1/11	PLOT PLAN
2/11	PLAN
3/11	ELEVATIONS
4/11	INTERIOR PERSPECTIVE
5/11	SECTION
6/11	CONCRETE STRUCTURES
7/11	CONCRETE STRUCTURES
8/11	ILLUMINATION LAYOUT
9/11	HEATING LAYOUT
10/11	SANITARY LAYOUT (PLUMBING)
11/11	EXTERIOR PERSPECTIVE

PET ANIMALS AREA

PLAY AREA

GARAG

SWINGS

SAND BOX

BALANCING BEAM

SEESAW

GARDEN

N

SERVICE ROAD

GARAGES

SWINGS

BOX

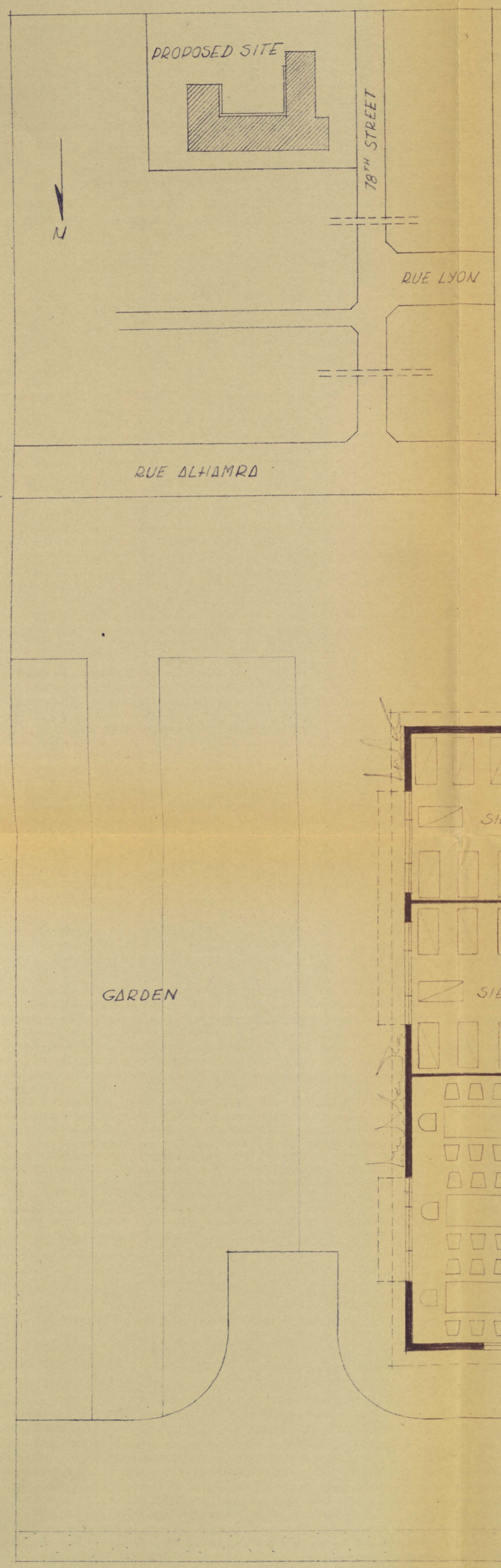
BALANCING BEAM

SEESAW

PARKING SHED

8m. ROAD

PROJECT : NURSERY SCHOOL TITLE : PLOT PLAN SCALE : 1:100 DATE : MARCH 1956	
A.U.B. SCHOOL OF ENGINEERING ARCHITECTURAL ENG'G. PROJECT NAME : VICTOR SHIBER	1/11


PROPOSED SITE
78TH STREET
RUE LYON
RUE ALHAMRA
N
SITE PLAN
SCALE 1.1000
GARDEN
N
PLAY AREA
SWINGS
SAND BOX
BALANCING BEAM
SEESAW
SIESTA R.
SIESTA R.
TERRACE
DRINKING FOUNTAIN
DINING R.
PANTRY
KITCHEN
GIRL'S W.C.
BOY'S W.C.
SERVICE LOBBY
MULTI-PURPOSE R.
DN. TO BOILER R.
LOUNGE
STORE R.
WOMEN'S
MEN'S
JANIT
DIRECT
W.CL.
W.CL.
TEACHE
ENTRANCE LO
SERVICE CAR ROAD

GARAGES

CAR ENTRANCE

STORE R.

WOMEN'S W.C.

MEN'S W.C.

JANITOR'S R.

DIRECTOR'S OFFICE

W.C.

W.C.

TEACHER'S OFFICE

SWINGS

BOX

BALANCING BEAM

SEESAW

FOUNTAIN

W.C.

BOY'S W.C.

ENTRANCE LOBBY

MULTI-PURPOSE R.

LOUNGE

DN. TO BOILER R.

CAR ROAD

PARKING AREA

78TH STREET

8 M. ROAD
DEAD END STREET

COVERED PORCH

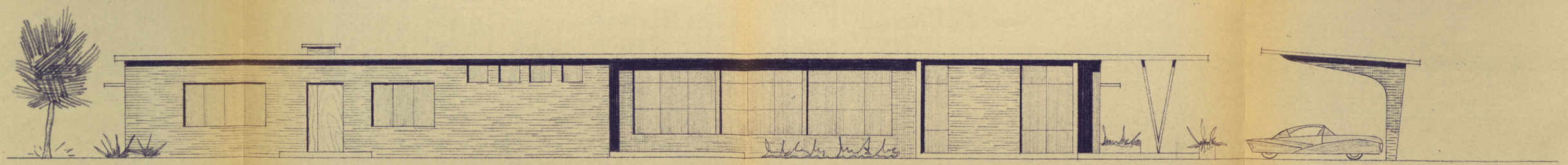
LAWN

SERVICE CAR ROAD

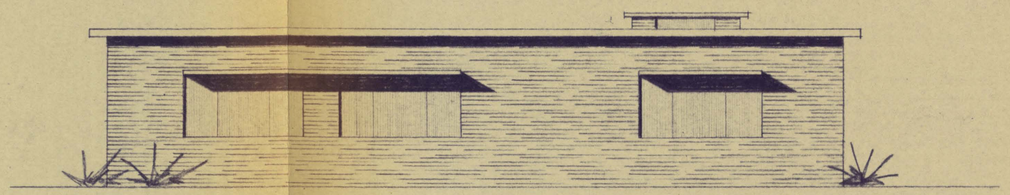
PROJECT : NURSERY SCHOOL
TITLE : PLAN
SCALE : 1:100 DATE : MARCH, 1956

A.U.B. SCHOOL OF ENGINEERING
ARCHITECTURAL ENG'G. PROJECT
NAME : VICTOR SHIBER

2/11



NORTH ELEV.



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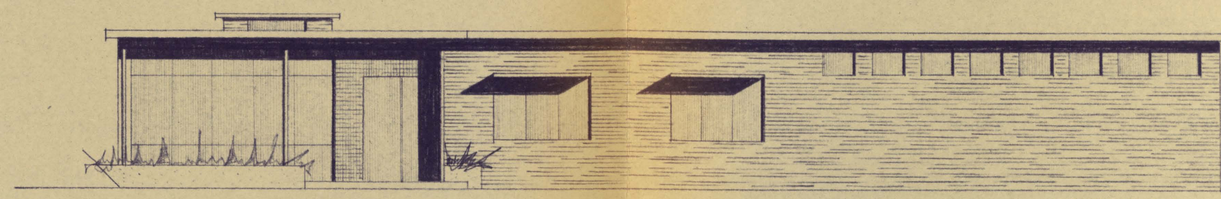

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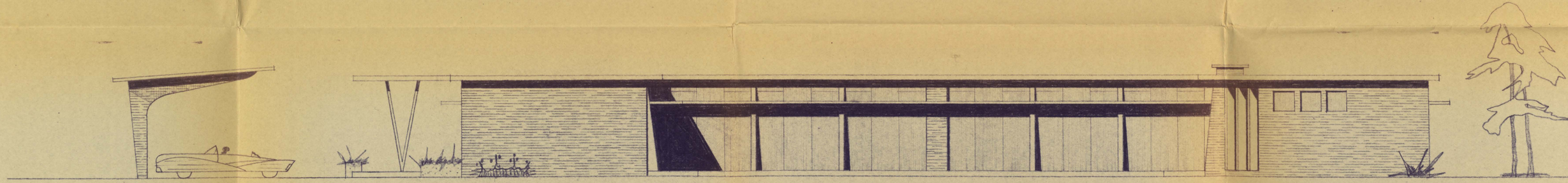
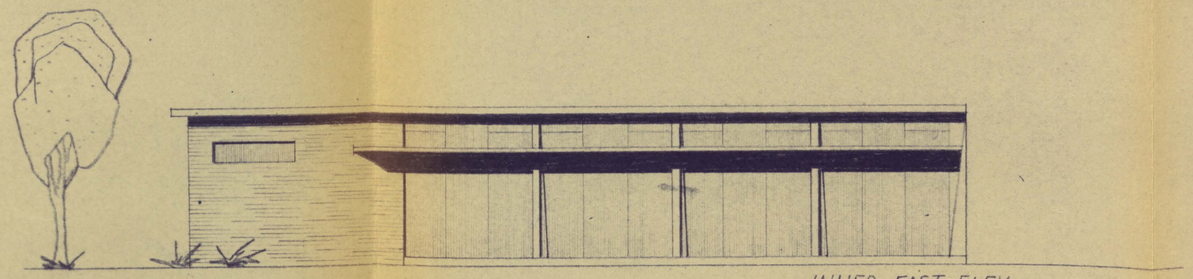
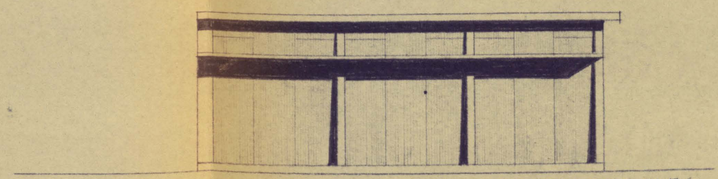


SOUTH ELEV.



INNER EAST ELEV.



INNER WEST ELEV.

PRO
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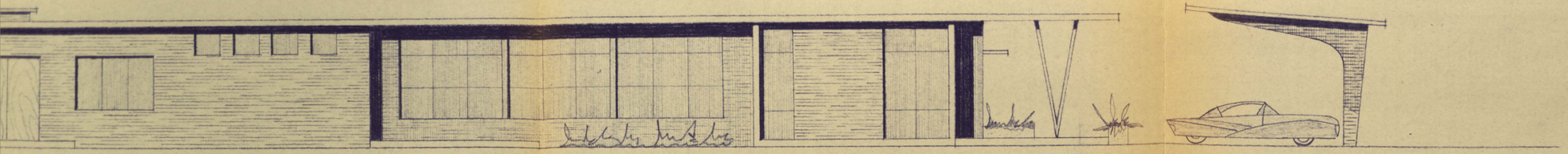
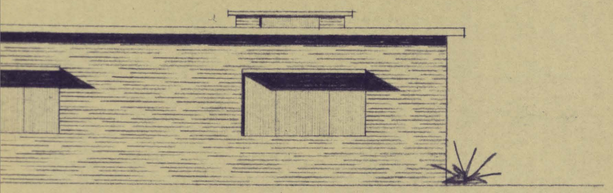
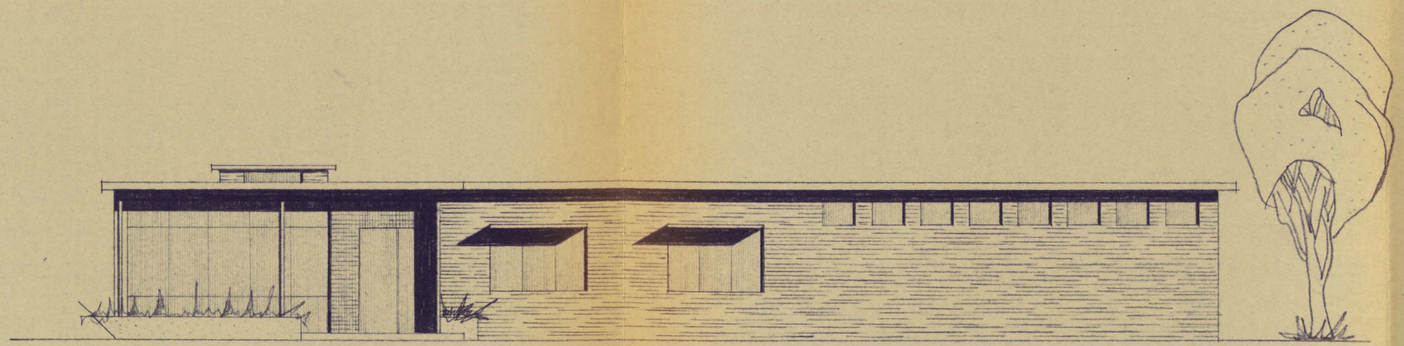
SCA



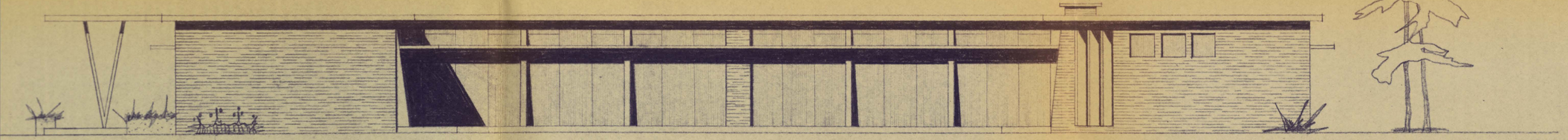
NORTH ELEV.



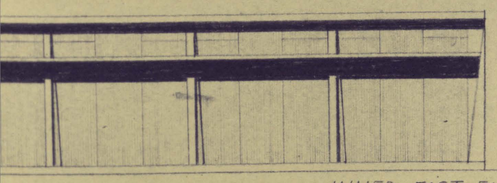
EAST ELEV.



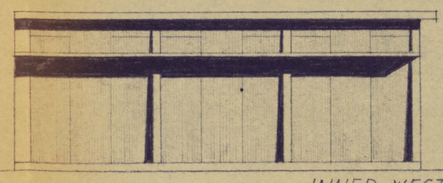
WEST ELEV.



SOUTH ELEV.



INNER EAST ELEV.



INNER WEST ELEV.

PROJECT : NURSERY SCHOOL
TITLE : ELEVATIONS
SCALE : 1:100 DATE : MARCH, 1956

A.U.B. SCHOOL OF ENGINEERING
ARCHITECTURAL ENG'G PROJECT
NAME : VICTOR SHIBER.

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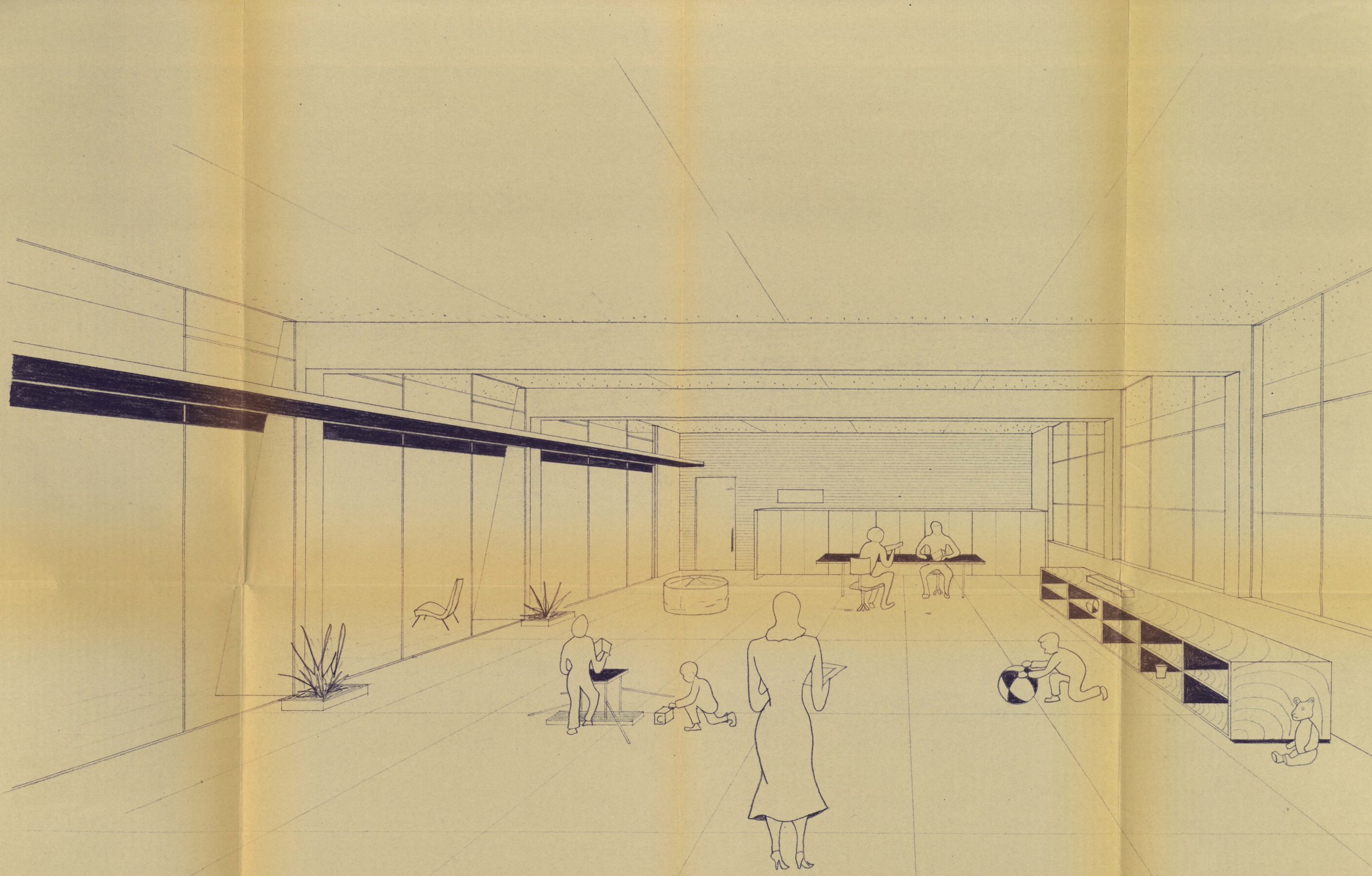
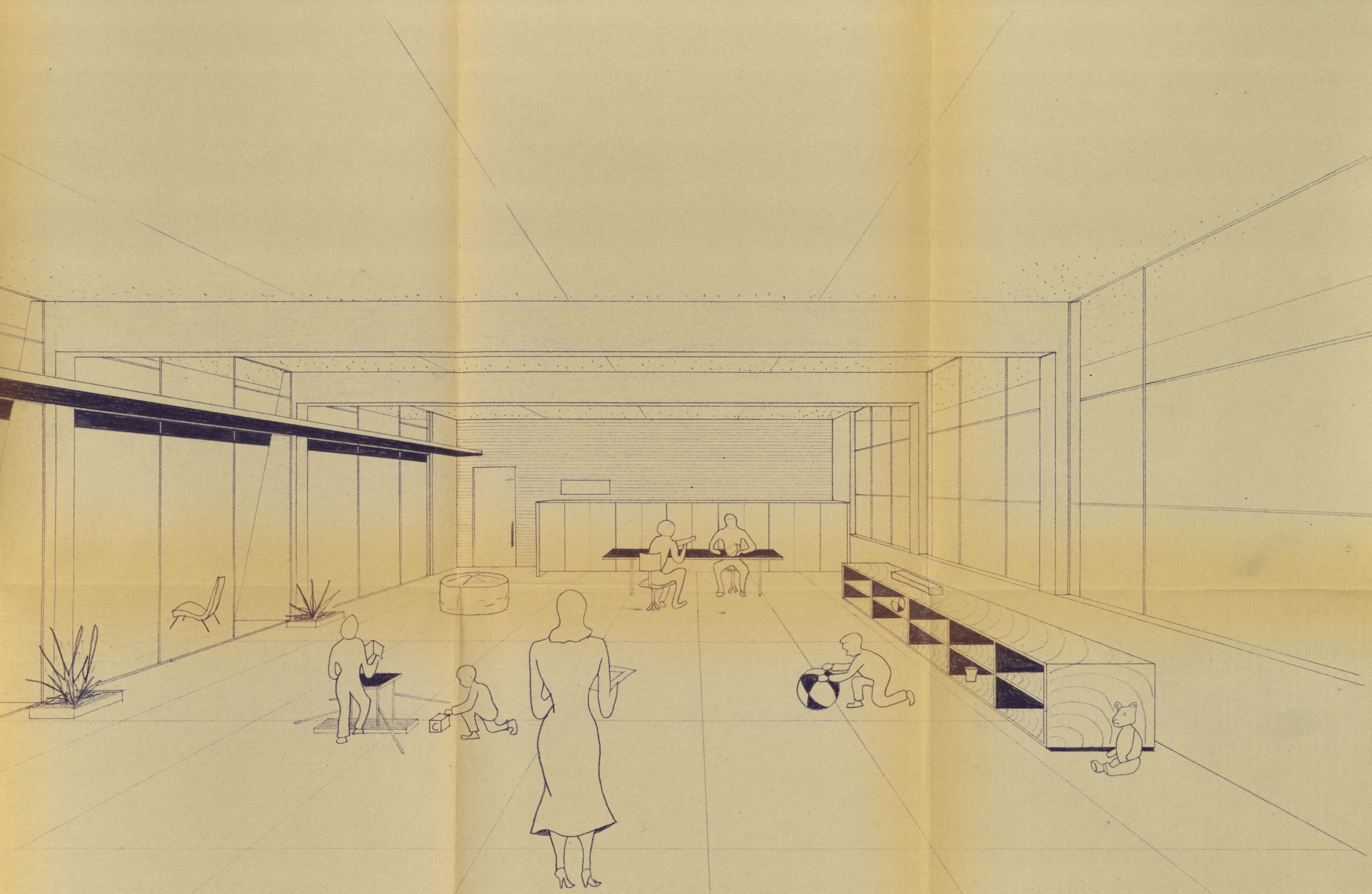


MULTI-PURPOSE ROOM



MULTI-PURPOSE ROOM

PROJECT : NURSERY SCHOOL
TITLE : INTERIOR PERSPECTIVE
SCALE : 1:50 DATE : MARCH, 1956

A.U.B. SCHOOL OF ENGINEERING
ARCHITECTURAL ENG'G. PROJECT
NAME : VICTOR SHIBER

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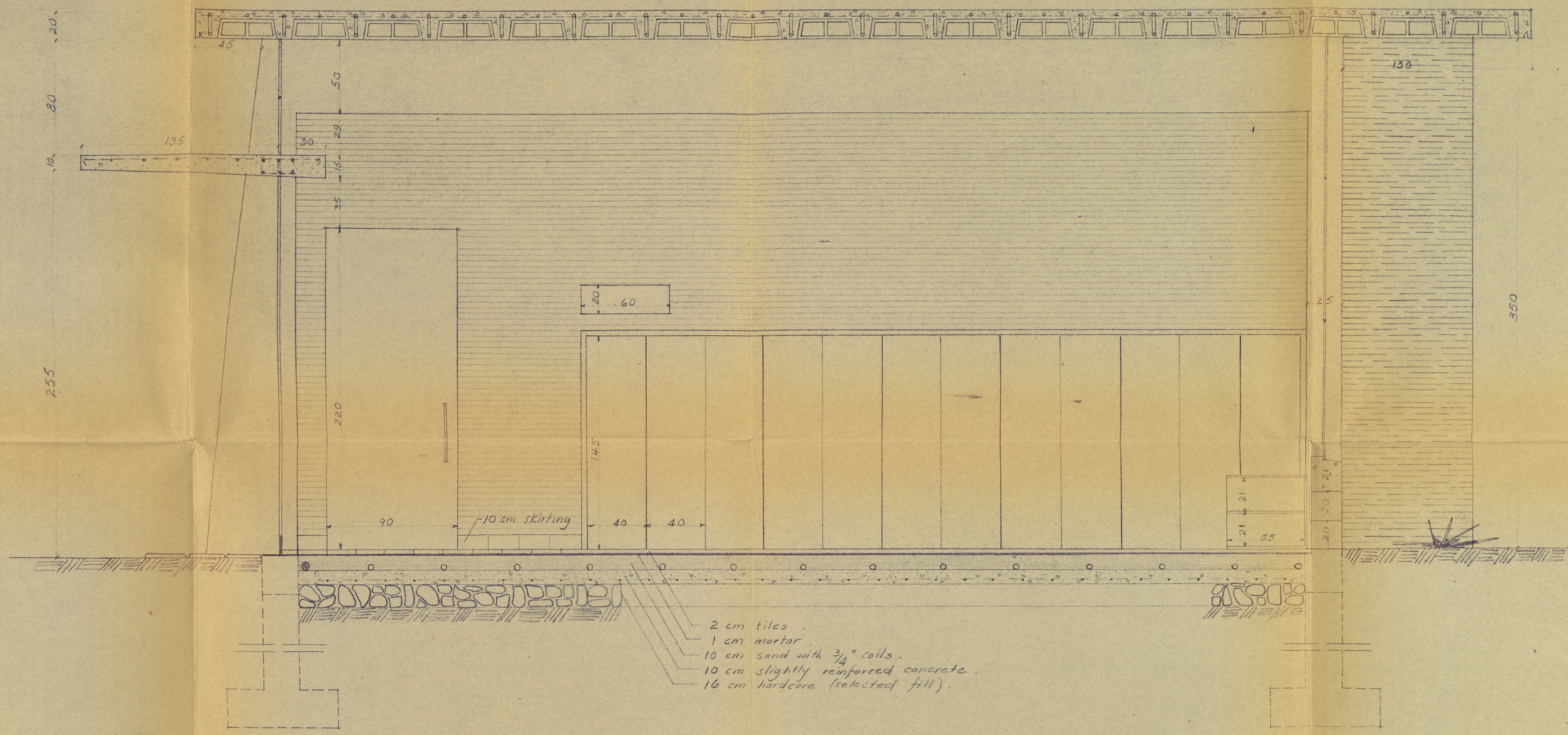
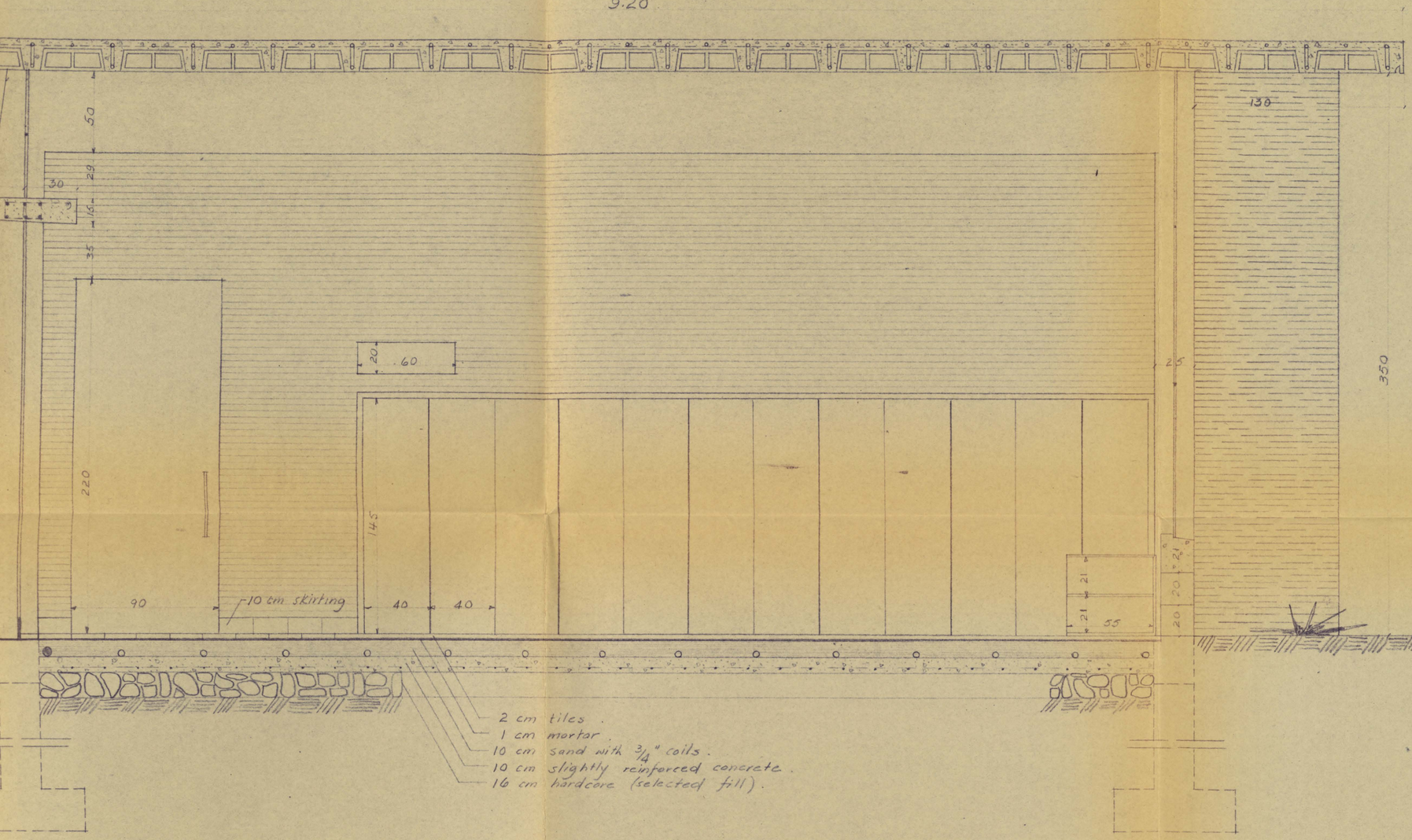
9.20

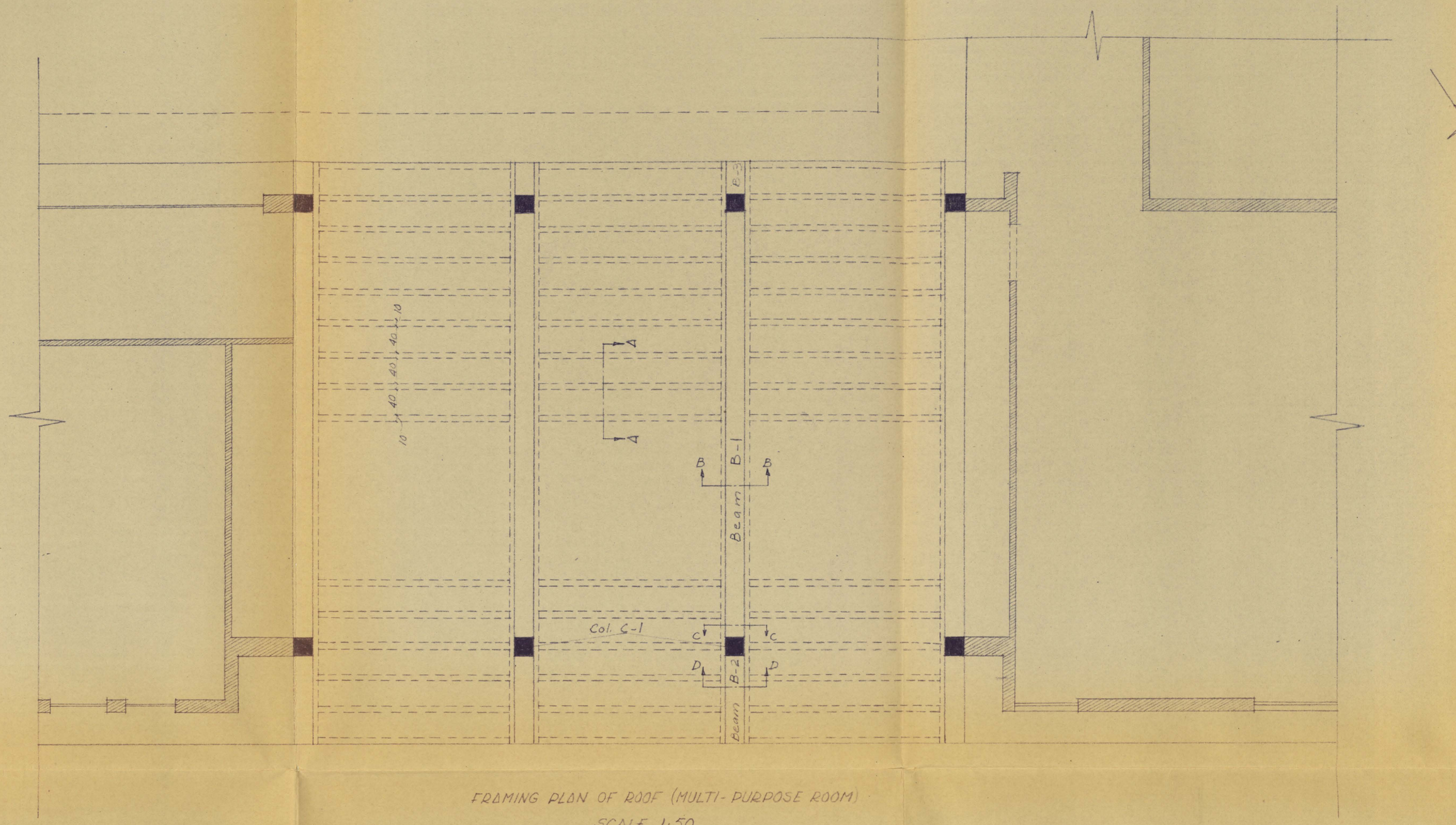


TRANSVERSE SECTION THRU MULTI-PURPOSE ROOM

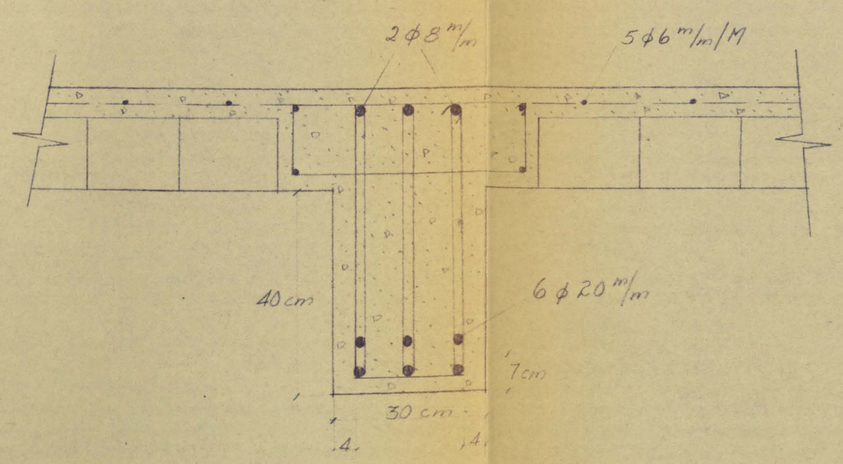


TRANSVERSE SECTION THRU MULTI-PURPOSE ROOM

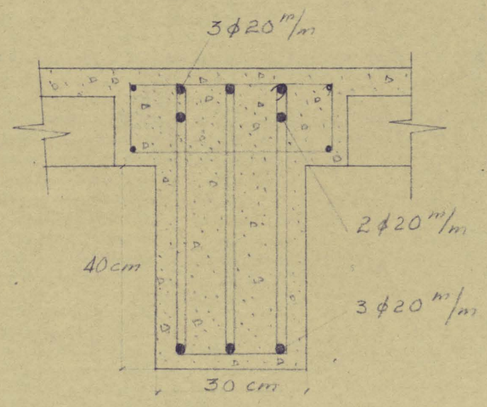
PROJECT : NURSERY SCHOOL	
TITLE : SECTION	
SCALE : 1:20 DATE : MARCH 1956	
A.U.B. SCHOOH OF ENINEERING ARCHITECTURAL ENG'G. PROJECT NAME: VICTOR SHIBER	5/11



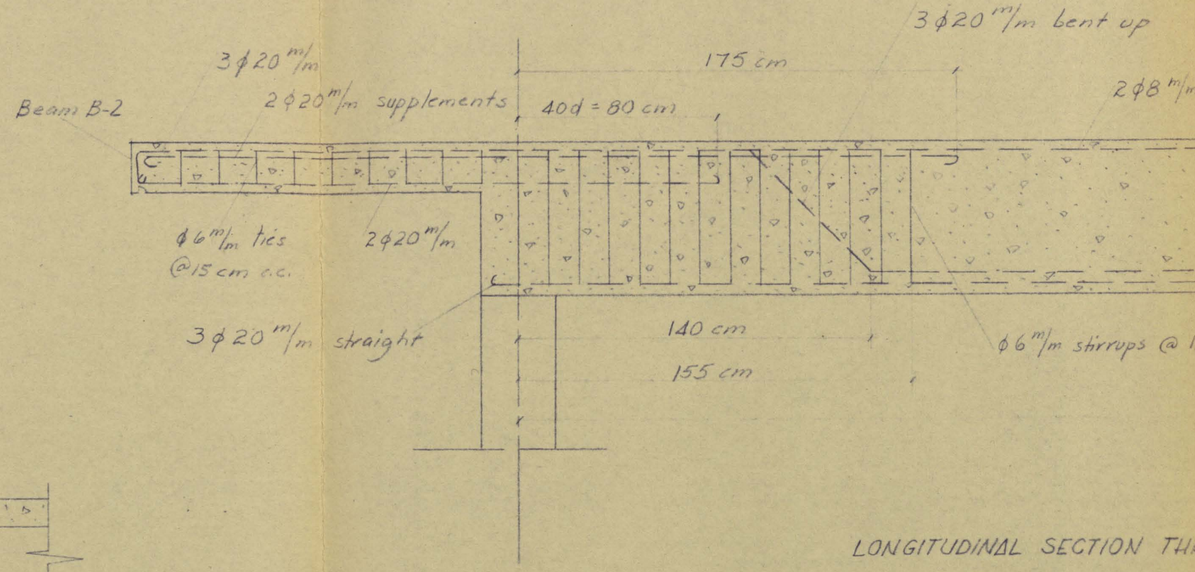
FRAMING PLAN OF ROOF (MULTI-PURPOSE ROOM)
SCALE 1:50



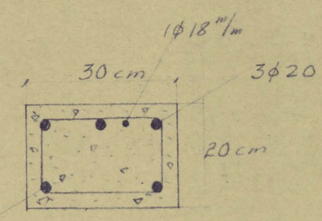
SECTION B-B AT CENTER OF BEAM B-1
SCALE 1:10



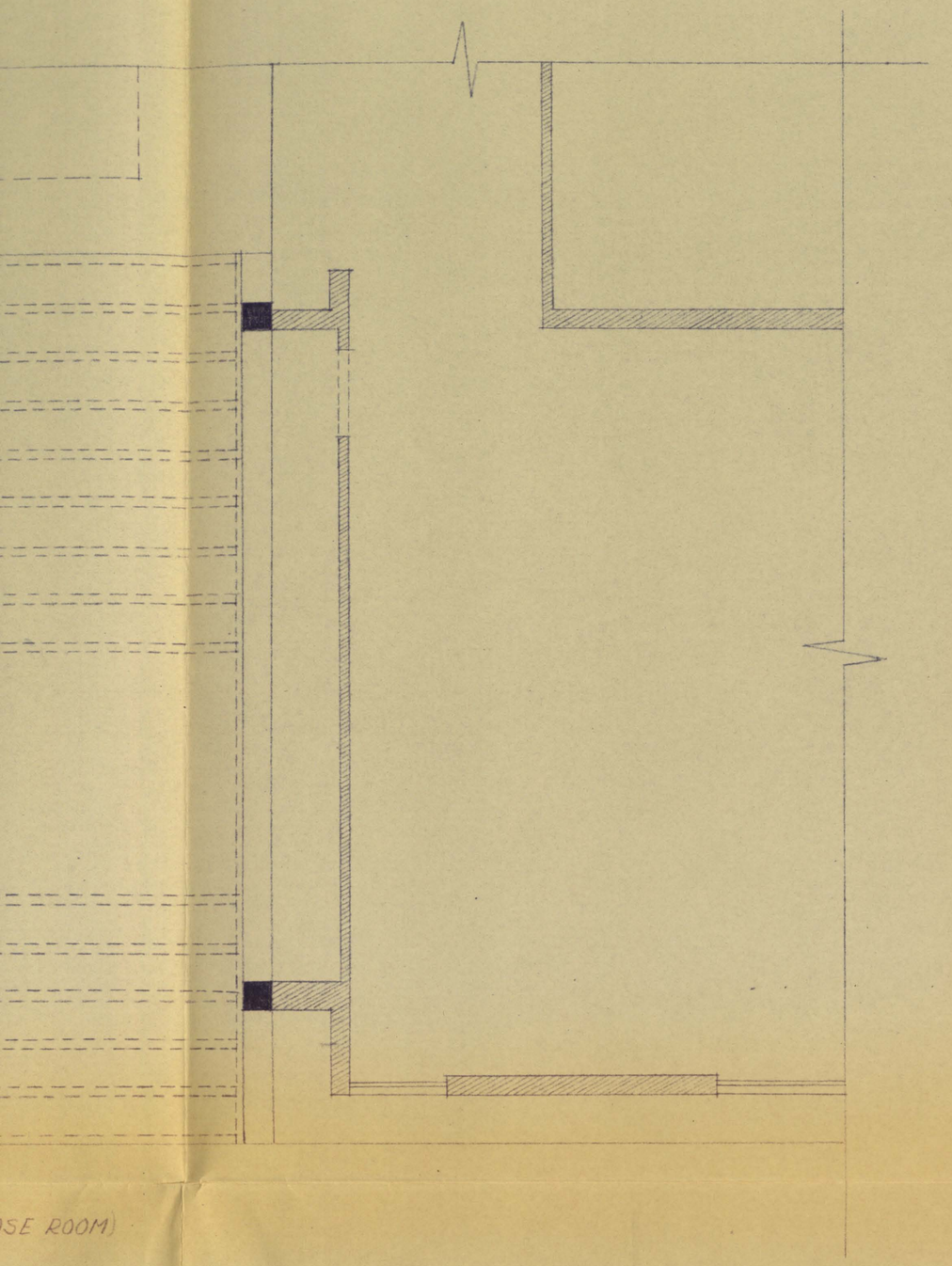
SECTION C-C AT SUPPORT OF BEAM B-1
SCALE 1:10



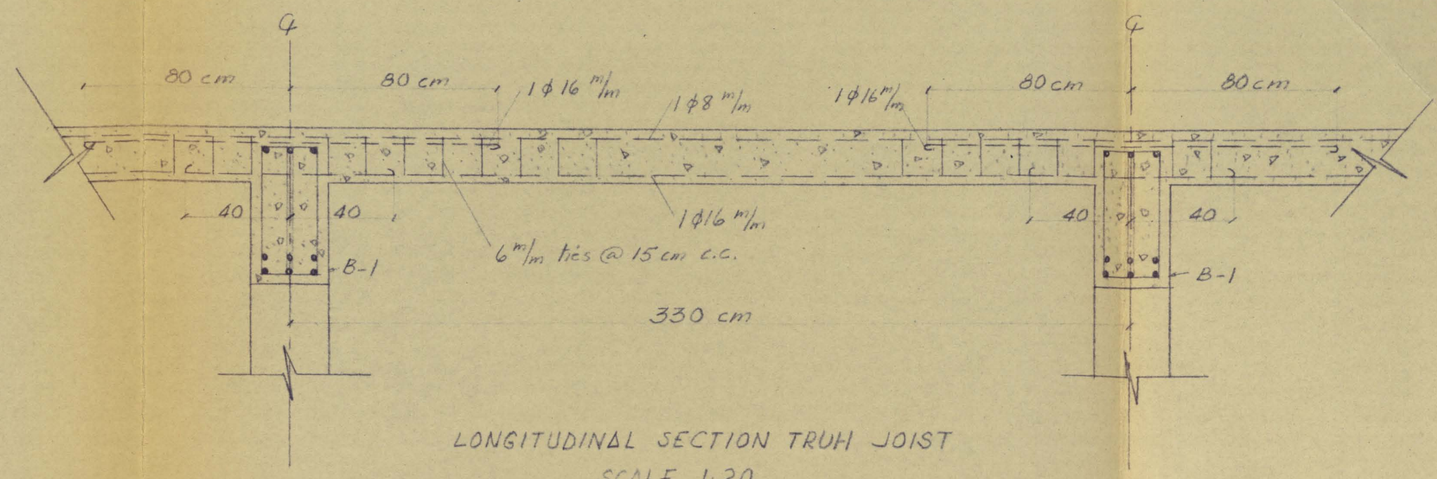
LONGITUDINAL SECTION THR



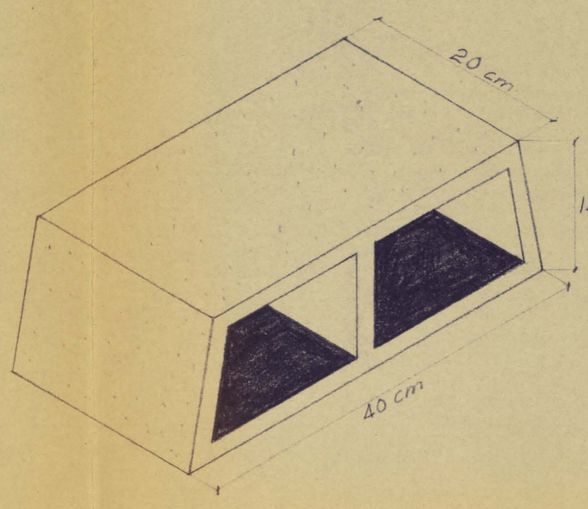
SECTION D-D BEAM B-2
SCALE 1:10



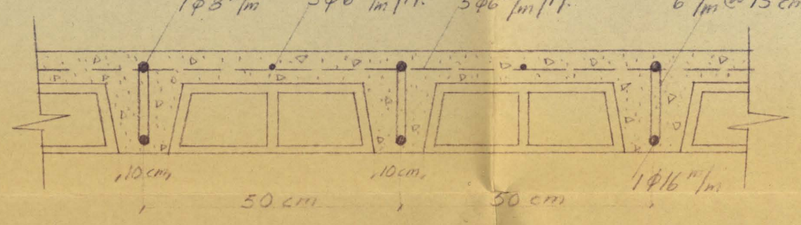
SE ROOM)



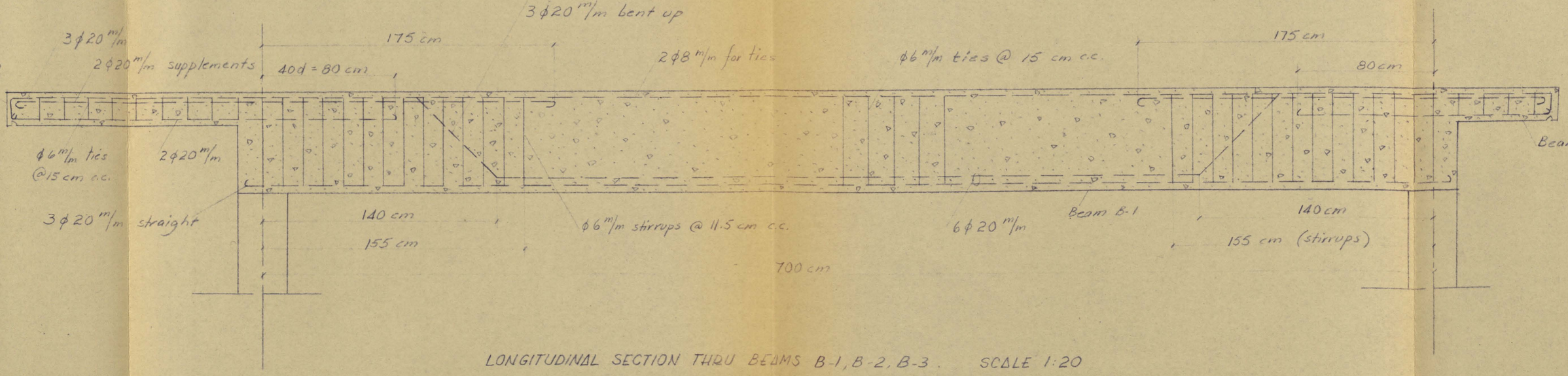
LONGITUDINAL SECTION THRU JOIST
SCALE 1:20



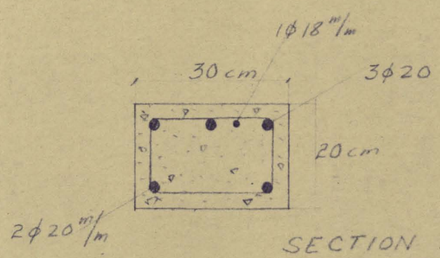
FILLER BLOCK USED IN ROOF



SECTION A-A SCALE 1:10

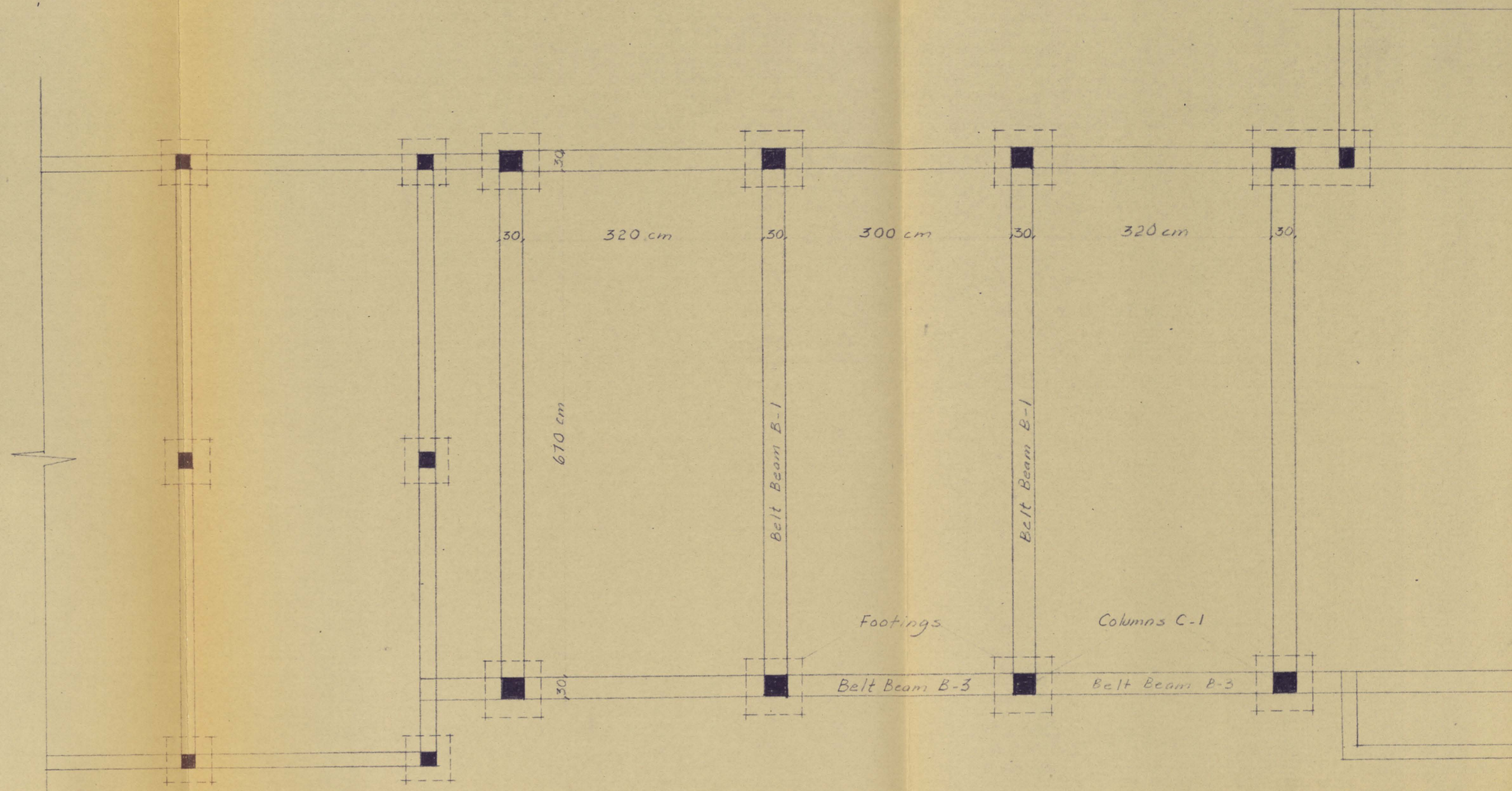


LONGITUDINAL SECTION THRU BEAMS B-1, B-2, B-3. SCALE 1:20

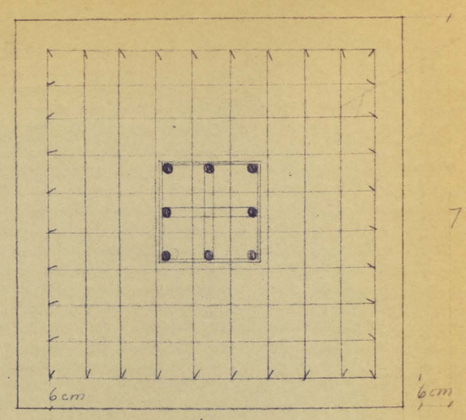


SECTION D-D BEAM B-2
SCALE 1:10

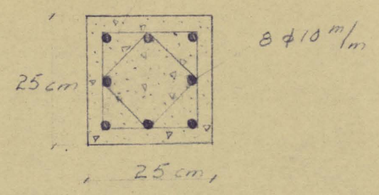
PROJECT : NURSERY SCHOOL TITLE : CONCRETE STRUCTURES SCALE : 1:50 1:20 1:10 DATE : MARCH '56	
A.U.B SCHOOL OF ENGINEERING ARCHITECTURAL ENG'G. PROJECT NAME : VICTOR SHIBER	6 / 11



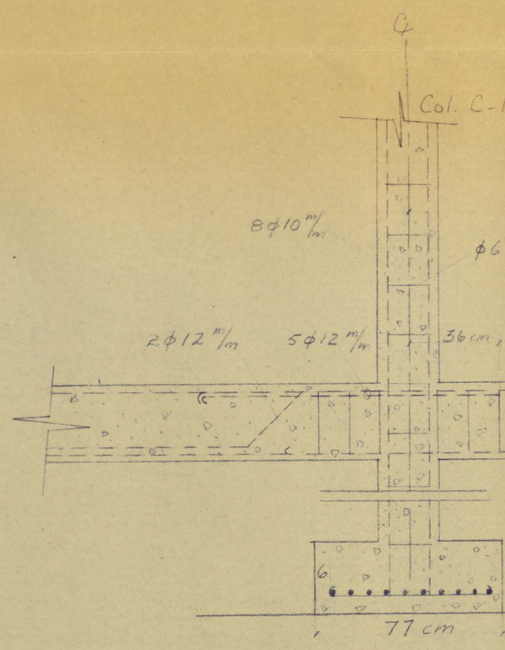
FRAMING PLAN FOR FOUNDATIONS (MULTI-PURPOSE ROOM) SCALE 1:50



PLAN OF FOOTING AND COLUMN C-1
SCALE 1:10



SECTION OF COLUMN C-1
SCALE 1:10



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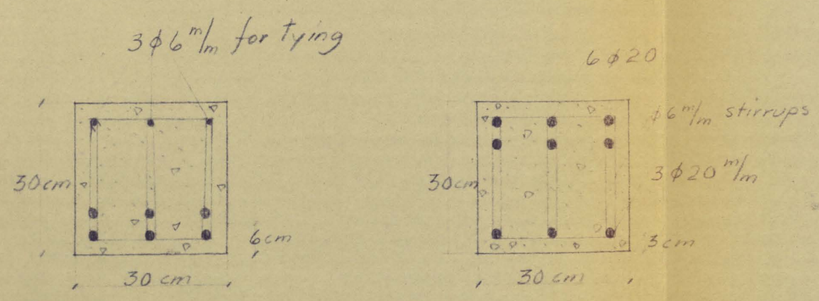
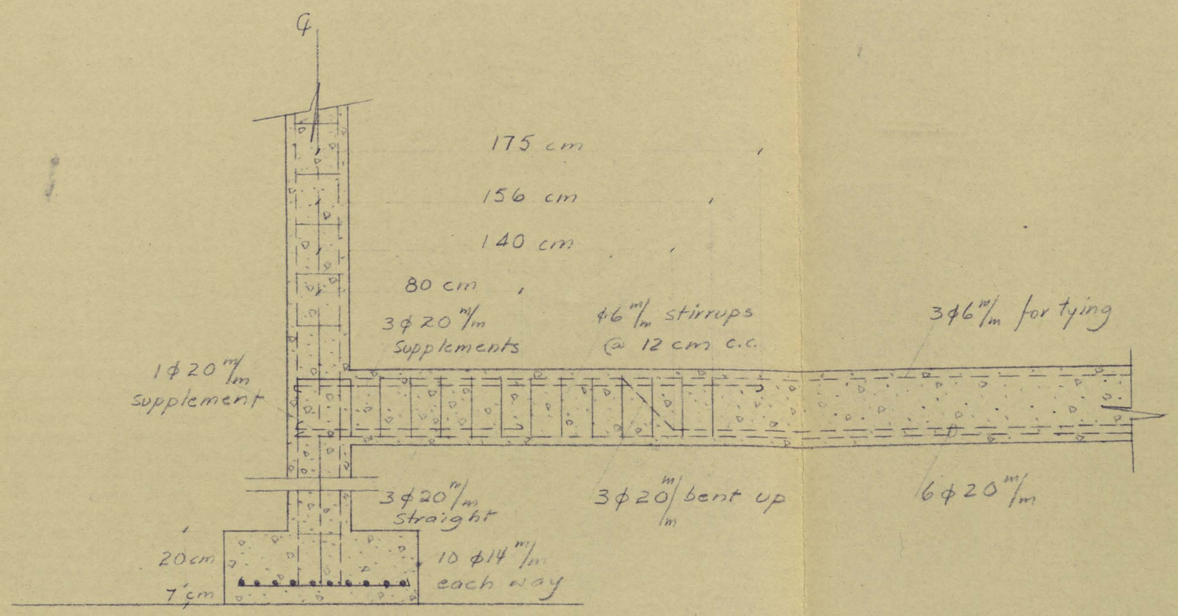
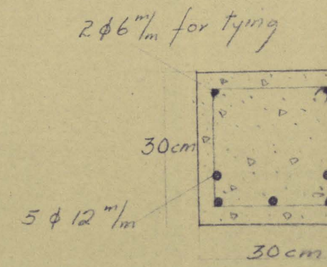


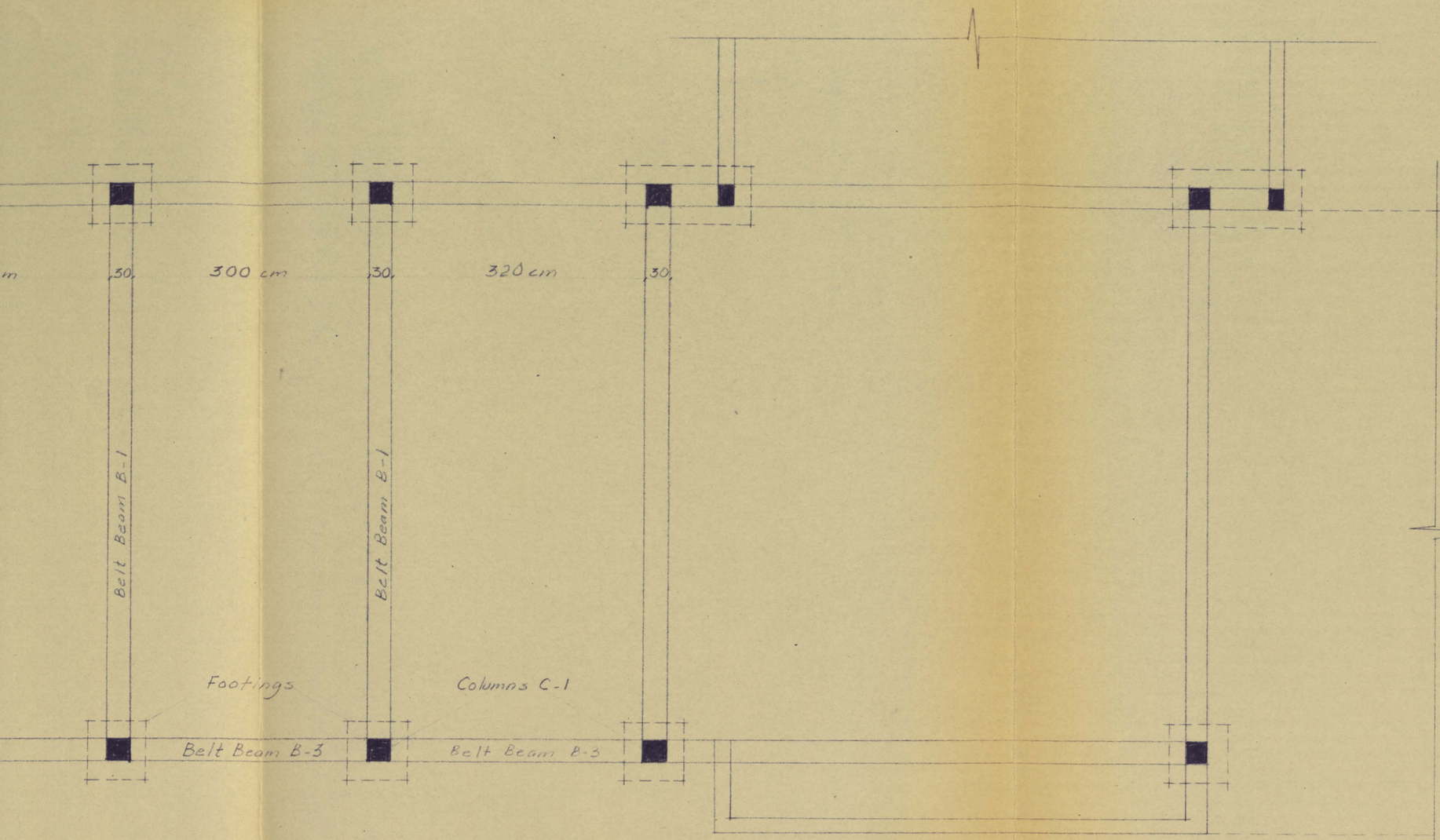
SECTION OF BELT BEAM B-1 AT CENTER & SUPPORT RESPECTIVELY
SCALE 1:10



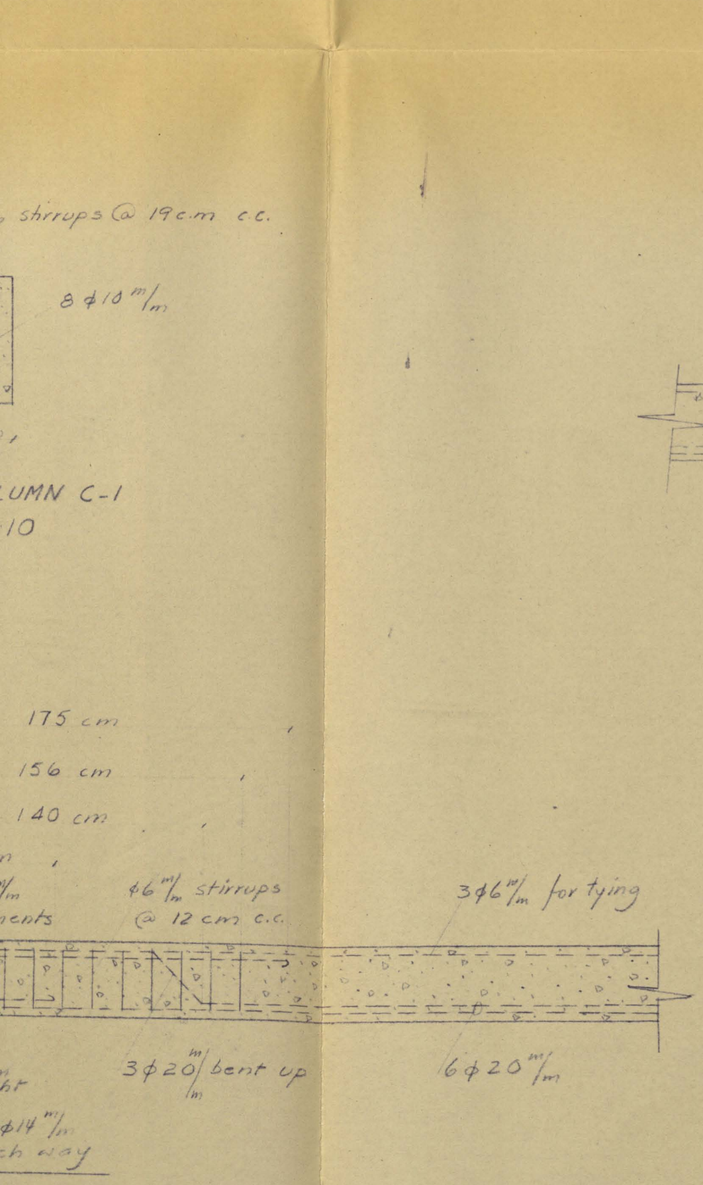
LONGITUDINAL SECTION THRU BELT BEAM B-1, COL. C-1 & FOOTING
SCALE 1:20



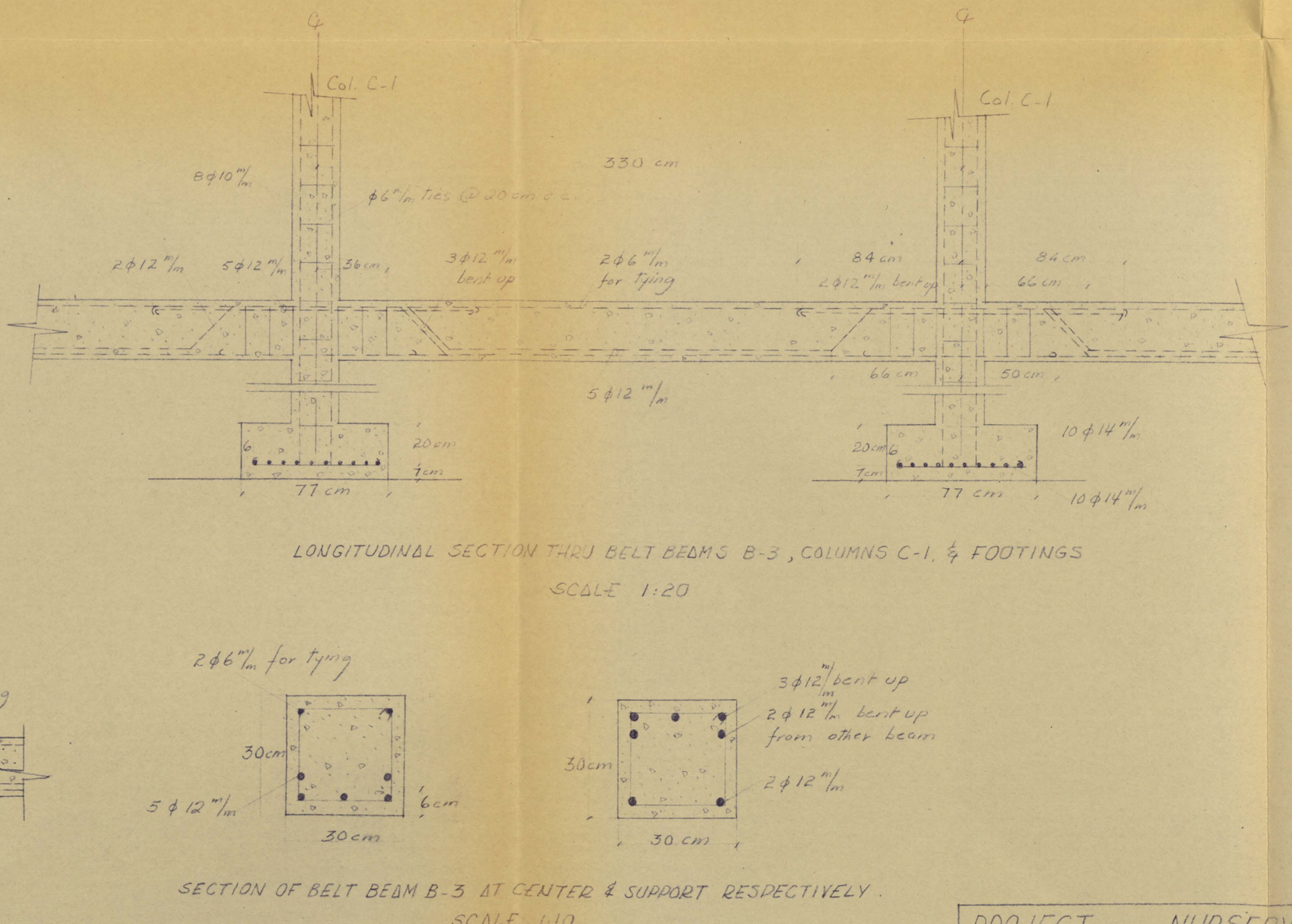
SECTION OF BELT B



FOR FOUNDATIONS (MULTI-PURPOSE ROOM) SCALE 1:50



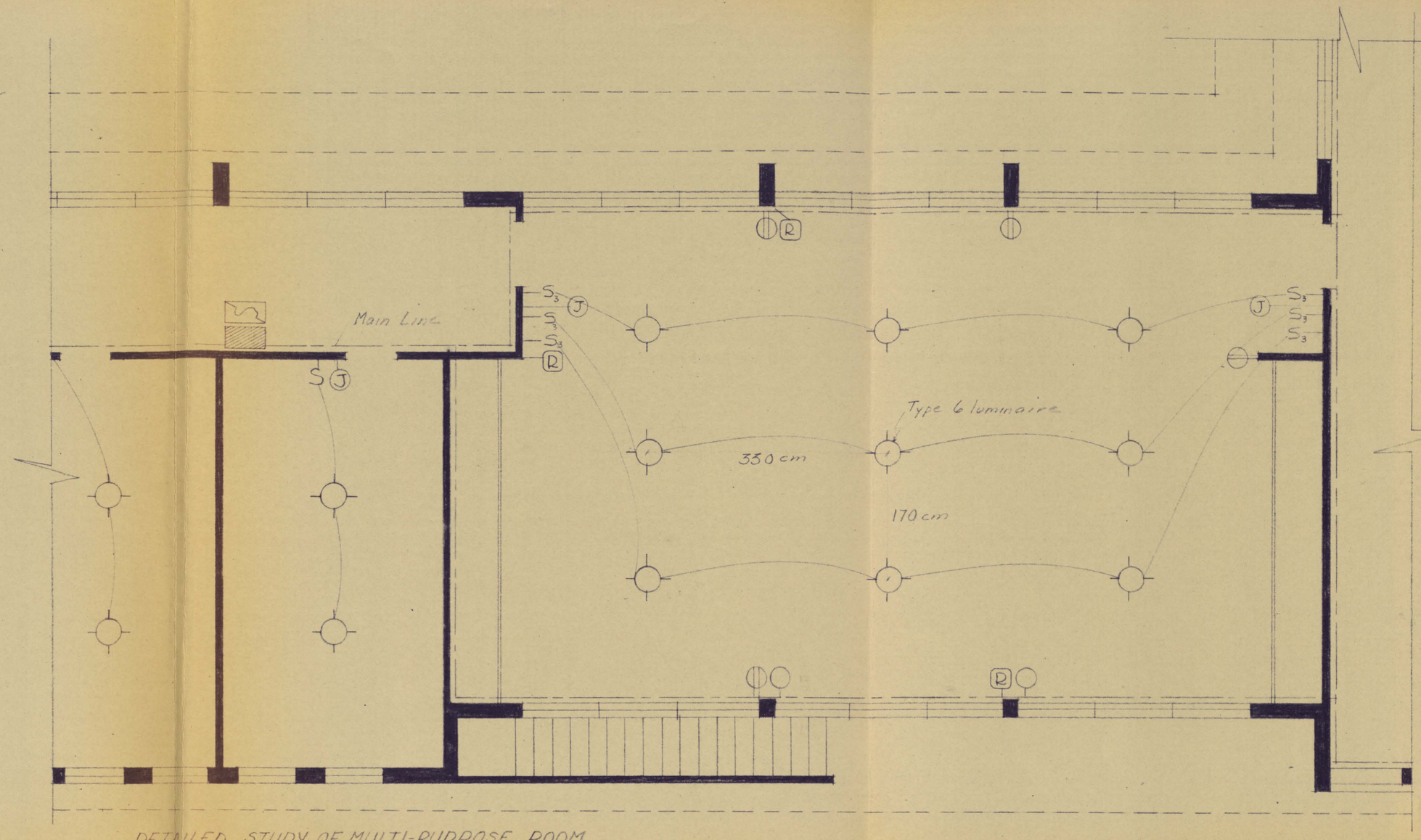
L SECTION THRU BELT BEAM B-1, COL. C-1 & FOOTING
SCALE 1:20



LONGITUDINAL SECTION THRU BELT BEAMS B-3, COLUMNS C-1, & FOOTINGS
SCALE 1:20

SECTION OF BELT BEAM B-3 AT CENTER & SUPPORT RESPECTIVELY.
SCALE 1:10

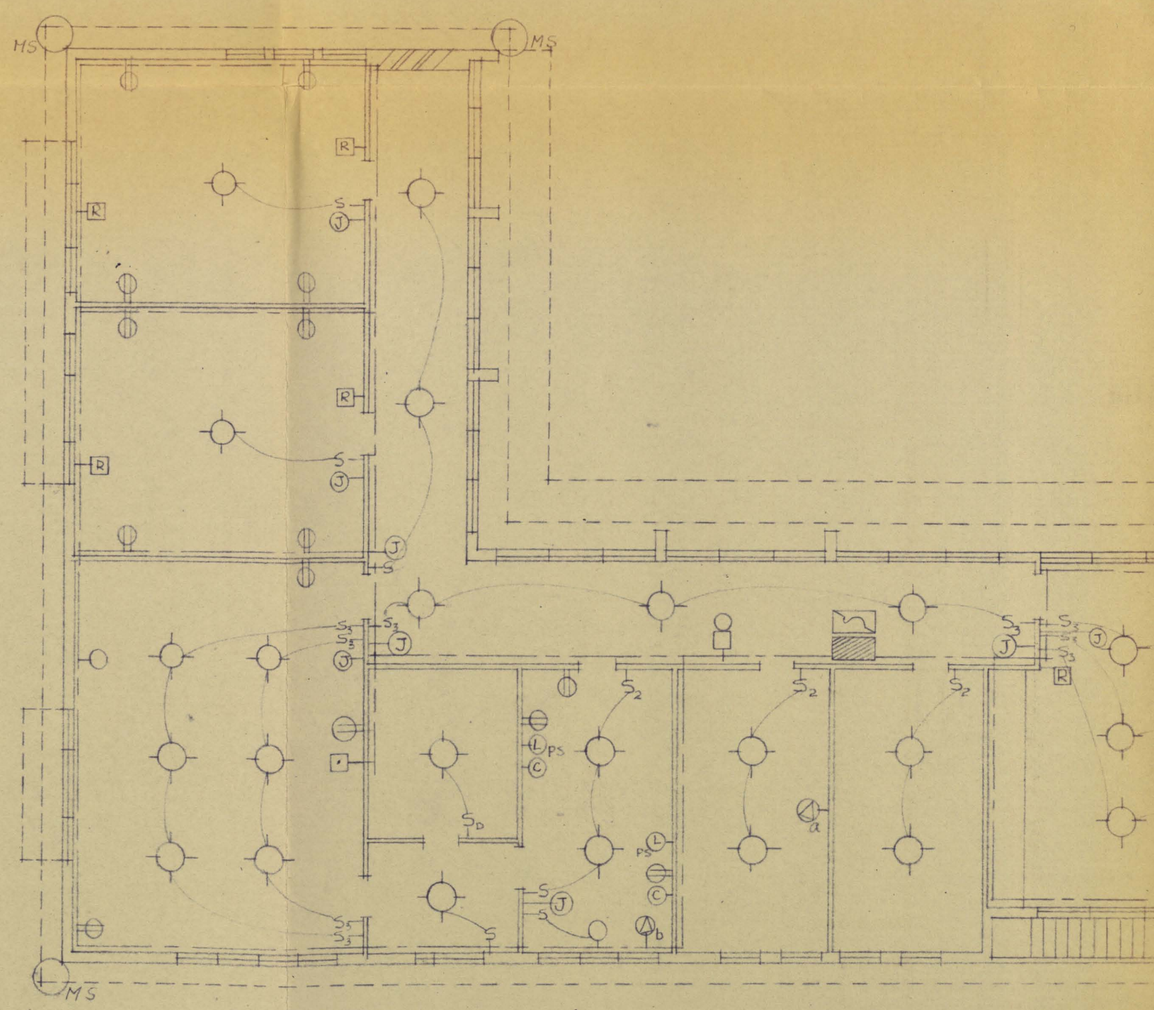
PROJECT : NURSERY SCHOOL TITLE : CONCRETE STRUCTURES SCALE : 1:50, 1:20, 1:10 DATE: MARCH 56	
A.U.B. SCHOOL OF ENGINEERING ARCHITECTURAL ENG'G. PROJECT NAME : VICTOR SHIBER	7/11



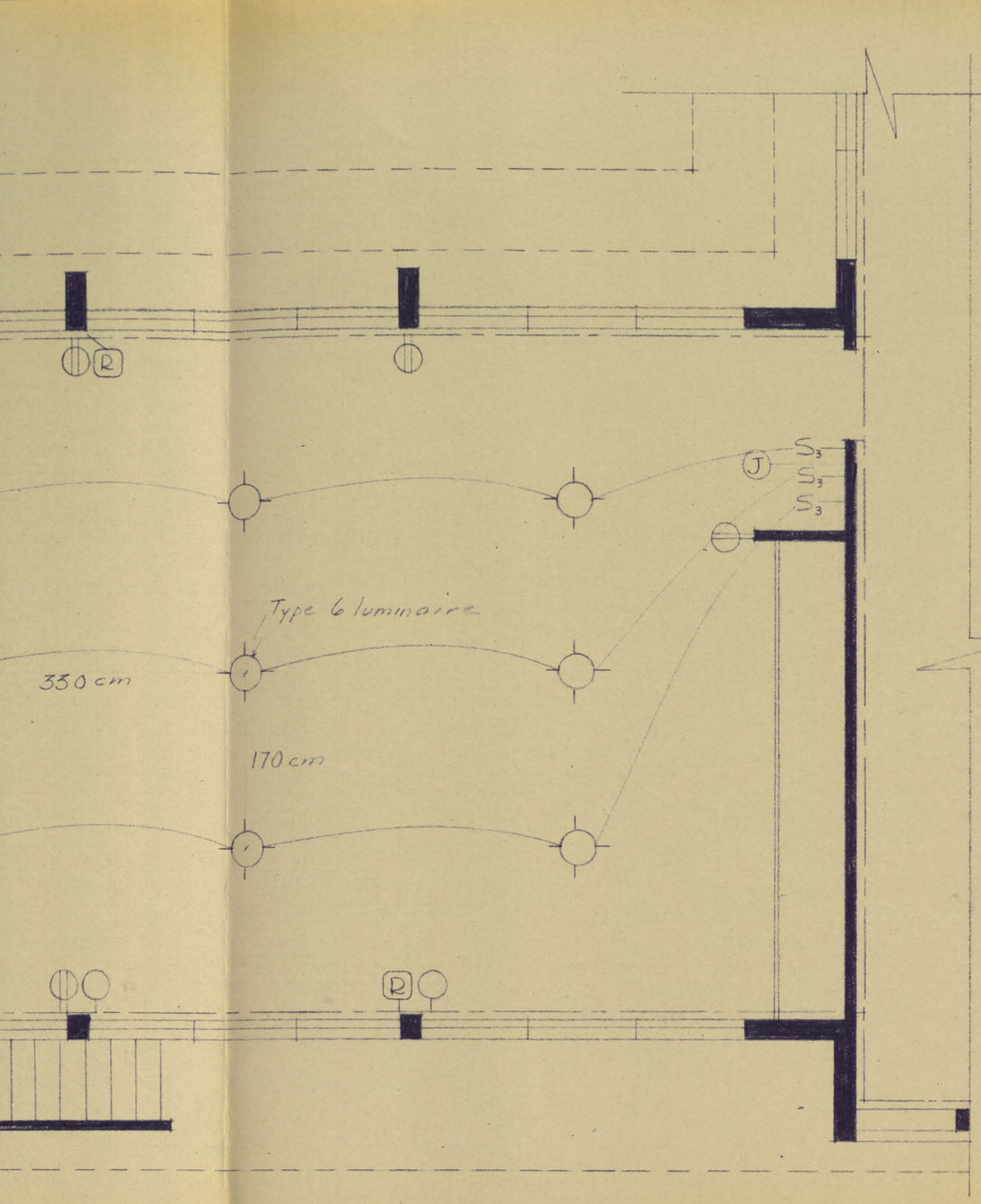
DETAILED STUDY OF MULTI-PURPOSE ROOM
SCALE 1:50

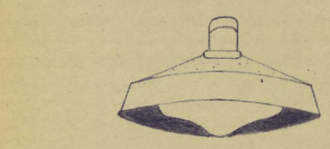
LEGEND

- LIGHTING PANEL
- SERVICE SWITCH
- DUPLEX CONVENIECE
- R RADIO OUTLET
- C CLOCK OUTLET
- O_a FLUSH BATH HEATER OUTLET
- O_b DISH WASHER OUTLET
- WATER HEATER OUTLET
- O_a ILLUMINATED HOUSE NUMBER
- TELEPHONE OUTLET
- CEILING OUTLET
- BRACKET OUTLET
- O_{MS} LANDING OUTLET
- L_{PS} LAMP HOLDER (PULL SWITCH)
- PUSH BUTTON
- BELL
- BUZZER
- JUNCTION BOX
- S SINGLE POLE LOCAL SWITCH
- S_3 THREE WAY LOCAL SWITCH
- S_{MS} MASTER SWITCH

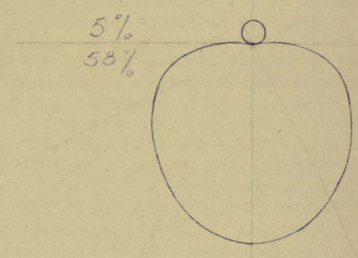


GENERAL ILLUMINATION TREATMENT OF SCHO

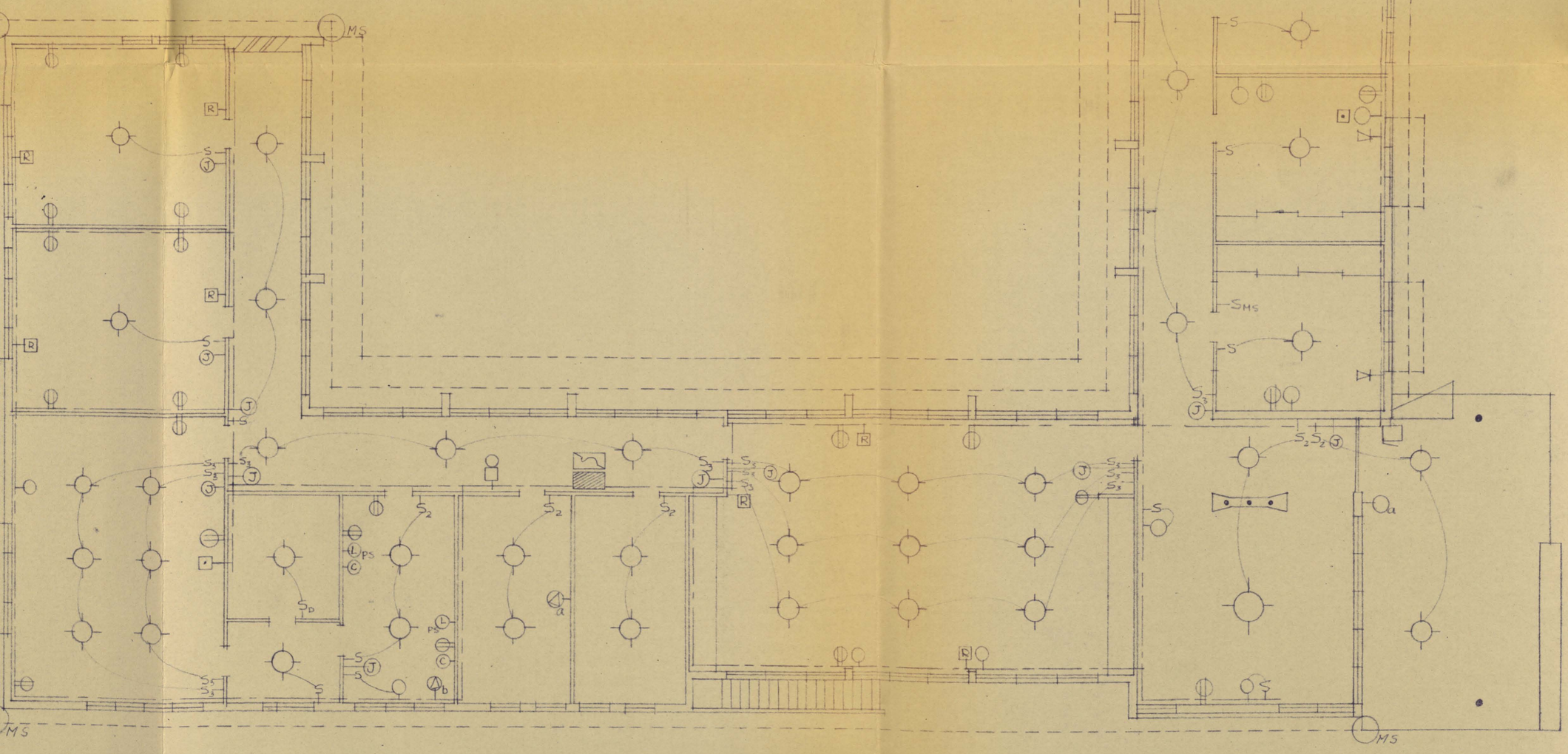




TYPE 6 LUMINAIRE
RLM GLASSTEEL DIFFUSER



DISTRIBUTION



GENERAL ILLUMINATION TREATMENT OF SCHOOL

PROJECT : NURSERY SCHOOL
TITLE : ILLUMINATION LAYOUT
SCALE : 1:00 , 1.50 DATE : MARCH 1956

A.U.B. SCHOOL OF ENGINEERING
ARCHITECTURAL ENG'G. PROJECT
NAME : VICTOR SHIBER

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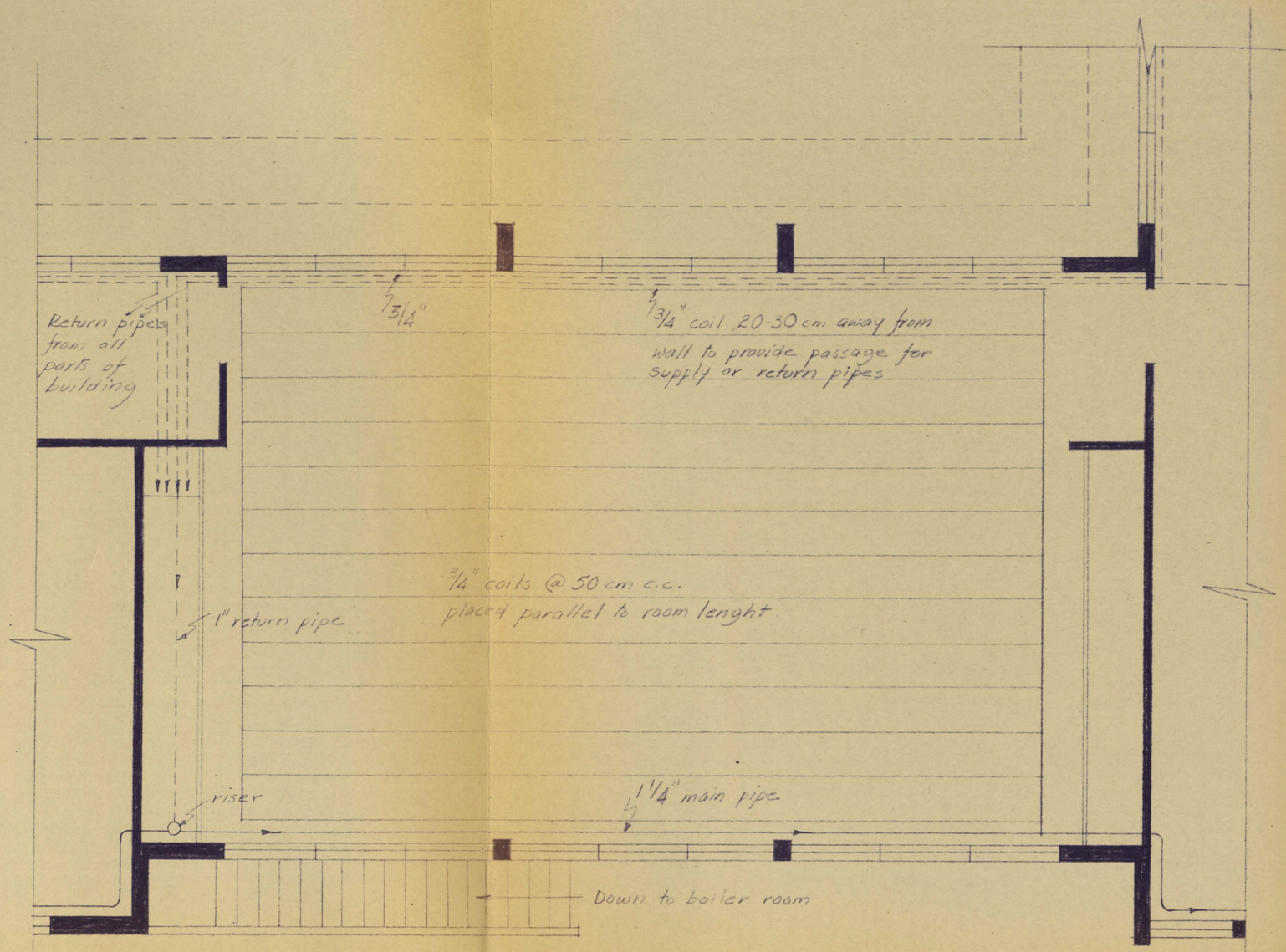
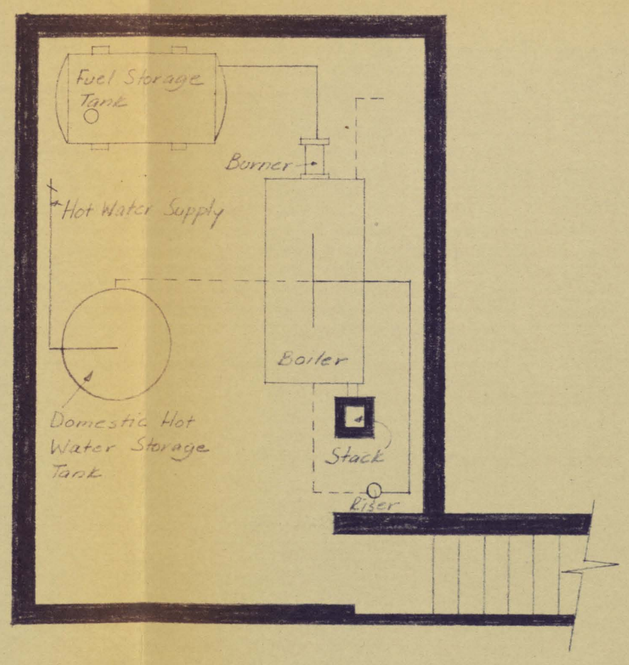
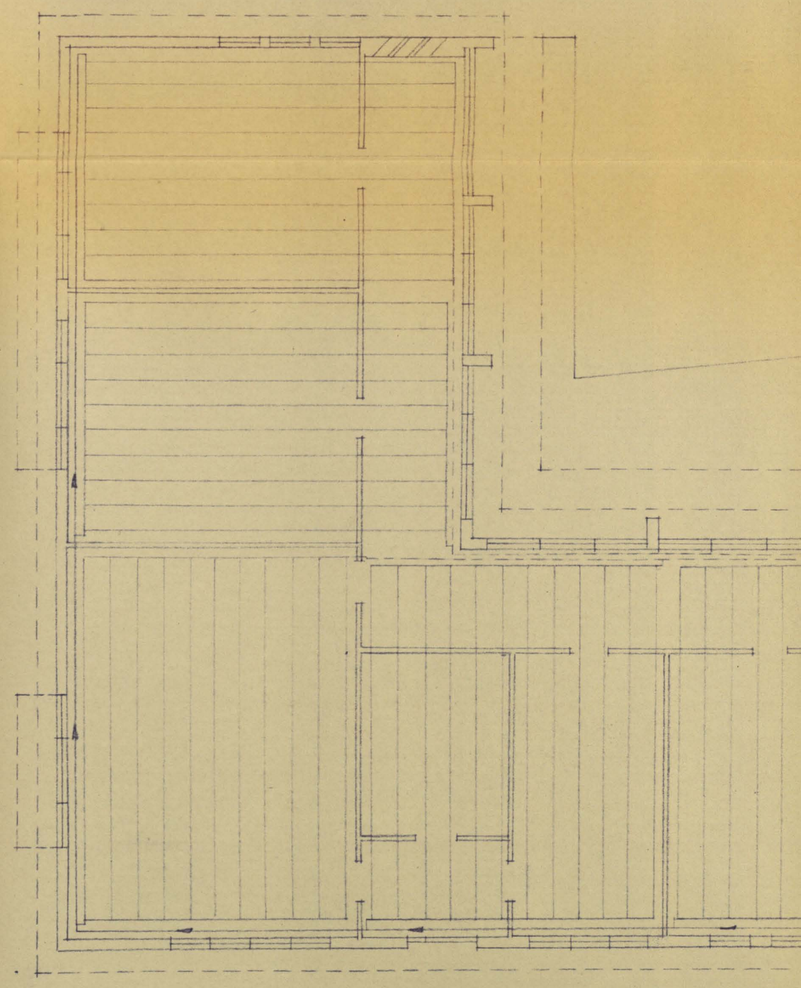


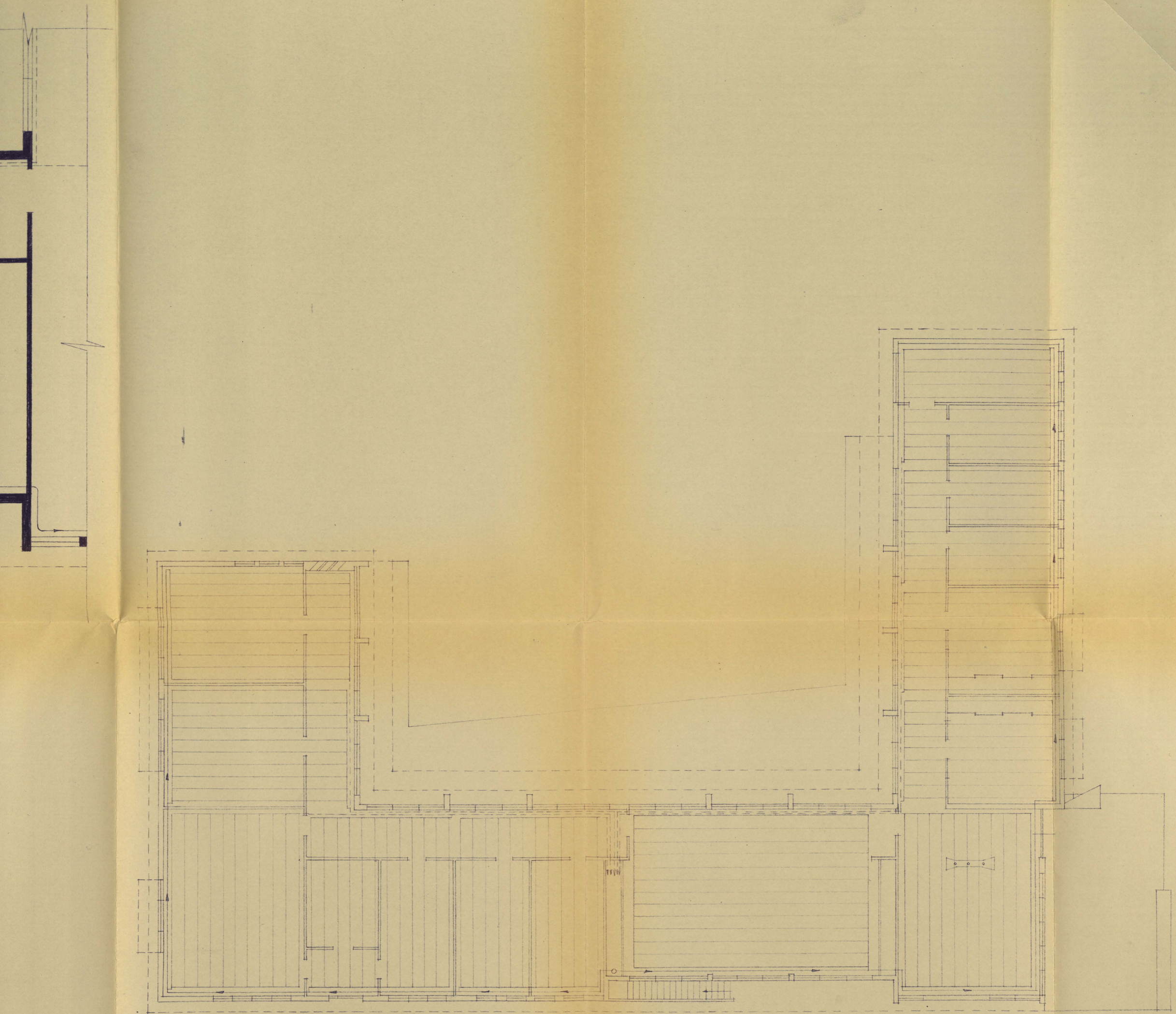
DETAILED HEATING LAYOUT OF MULTI-PURPOSE ROOM
SCALE 1:50



PLAN OF BOILER ROOM SCALE 1:50



FLOOR PANEL



FLOOR PANEL HEATING LAYOUT FOR BUILDING

PROJECT : NURSERY SCHOOL
TITLE : HEATING LAYOUT
SCALE: 1:100 DATE: MARCH 1956

A.U.B. SCHOOL OF ENGINEERING
ARCHITECTURAL ENG'G. PROJECT
NAME: VICTOR SHIBER.

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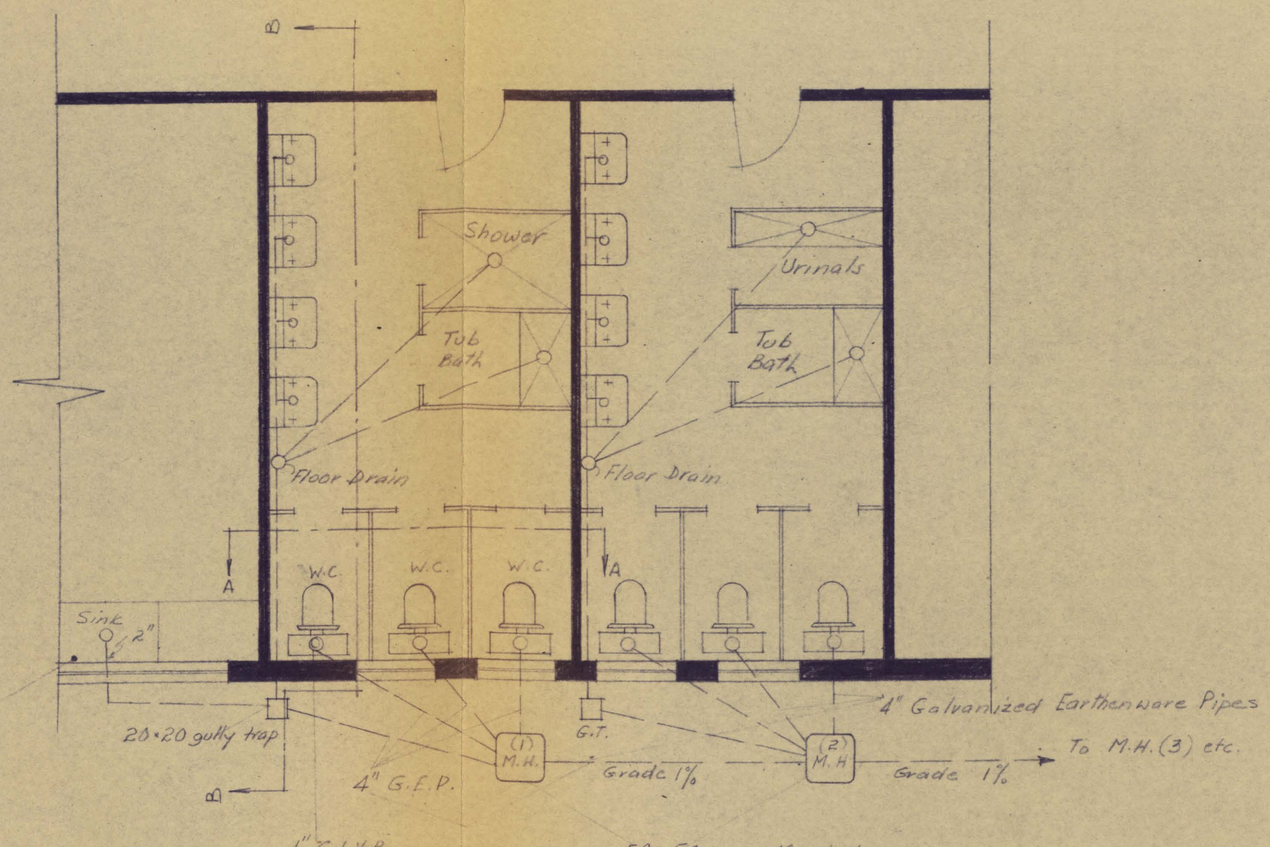
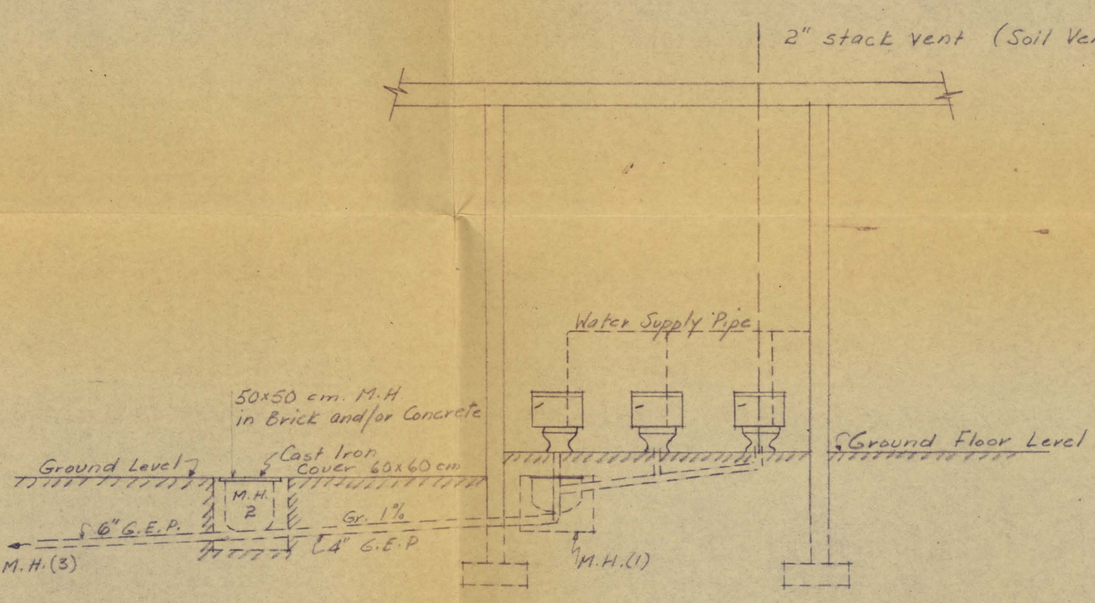
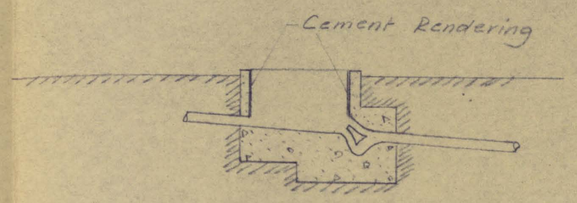


DETAILED STUDY OF CHIDREN'S LAVATORIES (W.C.'s)
SCALE 1:50

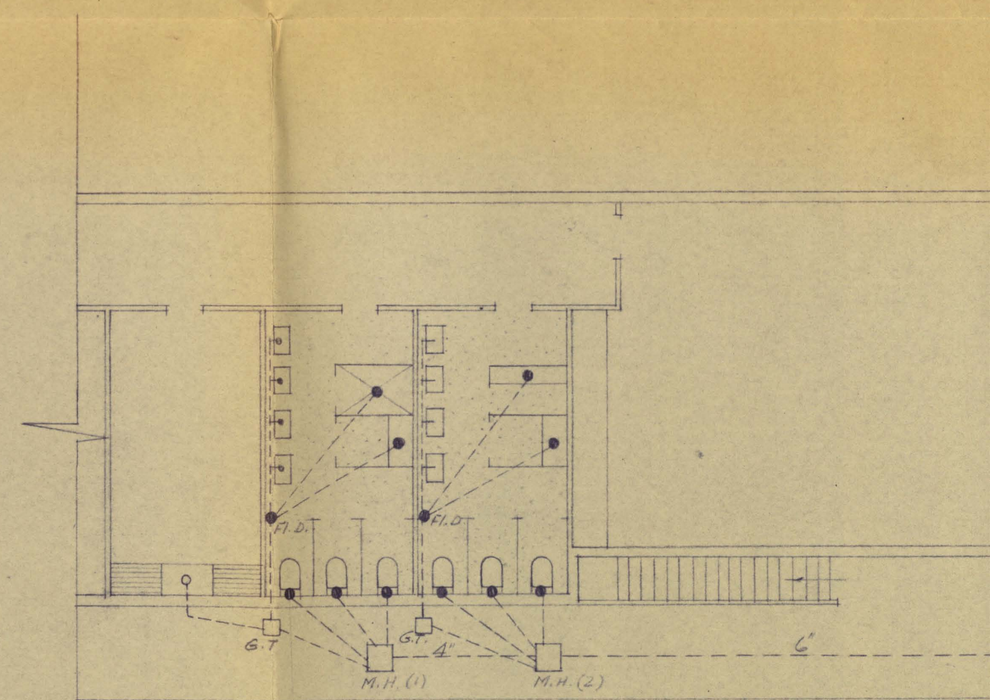


SECTION AA SCALE 1:50

SECTION B-B SCALE 1:50

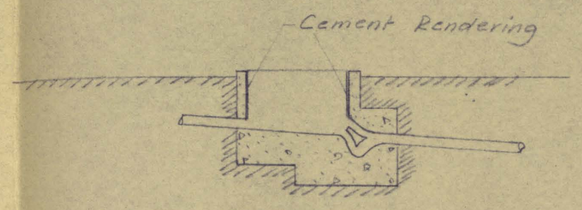


SECTION THRU DISCONNECTING CHAMBER
SCALE 1:50



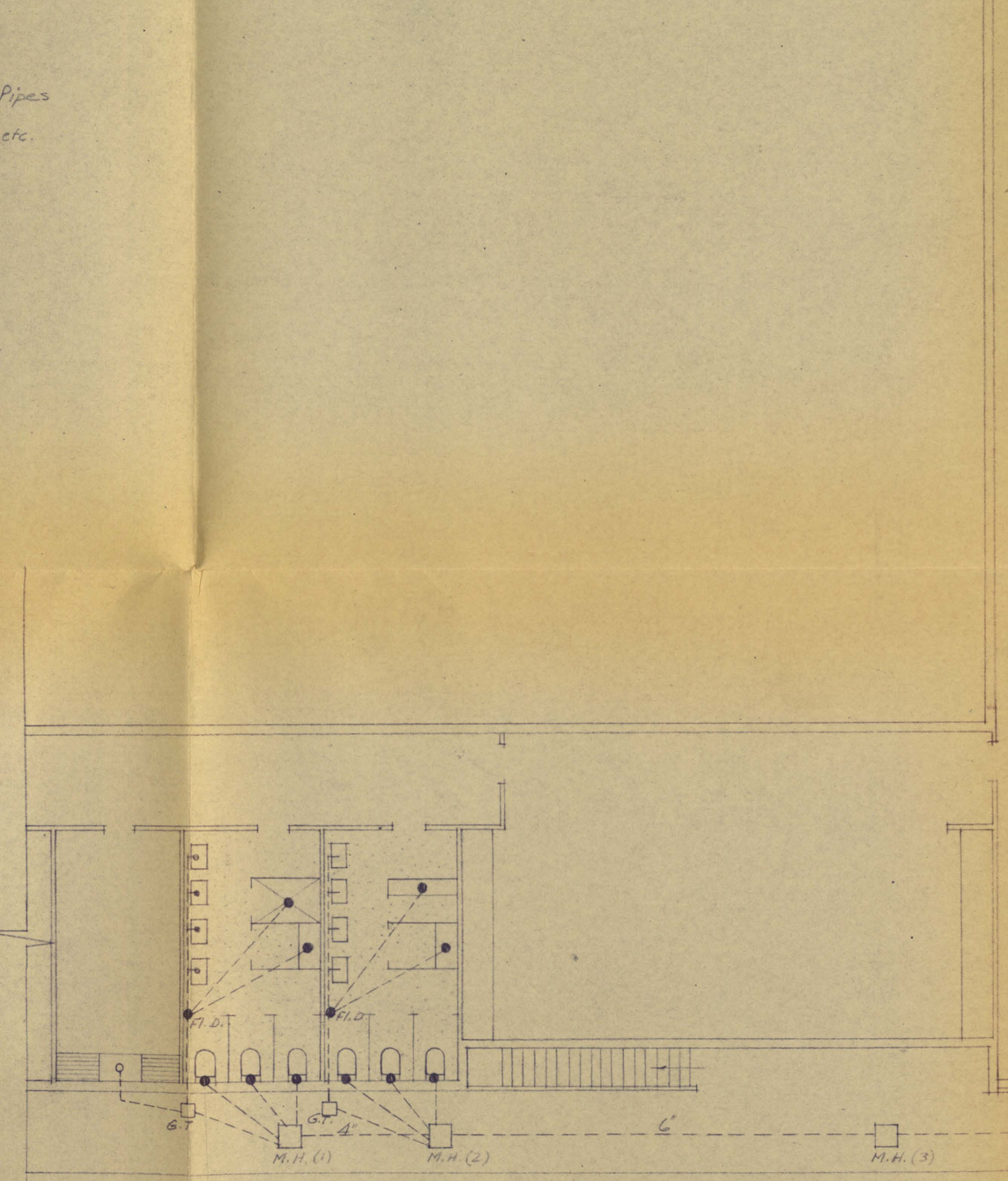
1" Cast Iron Vent Pipe
(1 meter above roof top

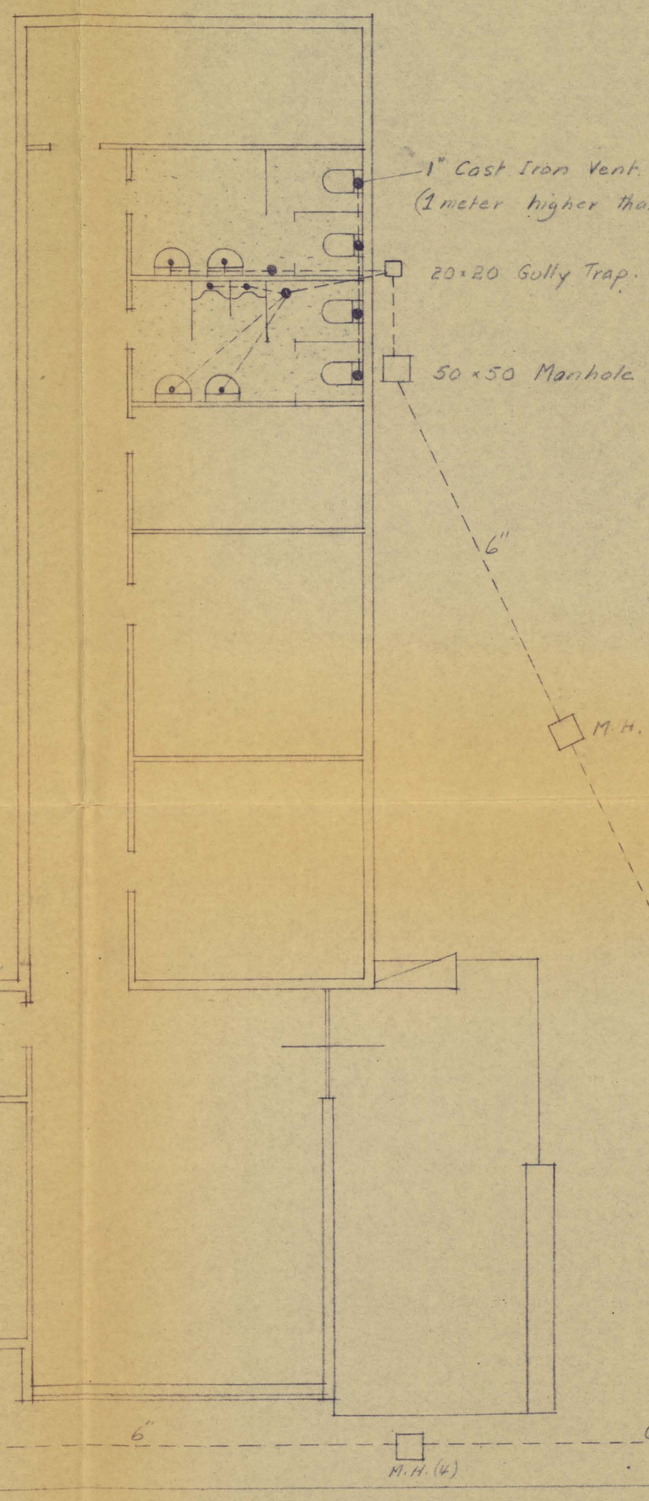
GENERA



SECTION THRU DISCONNECTING CHAMBER
SCALE 1:50

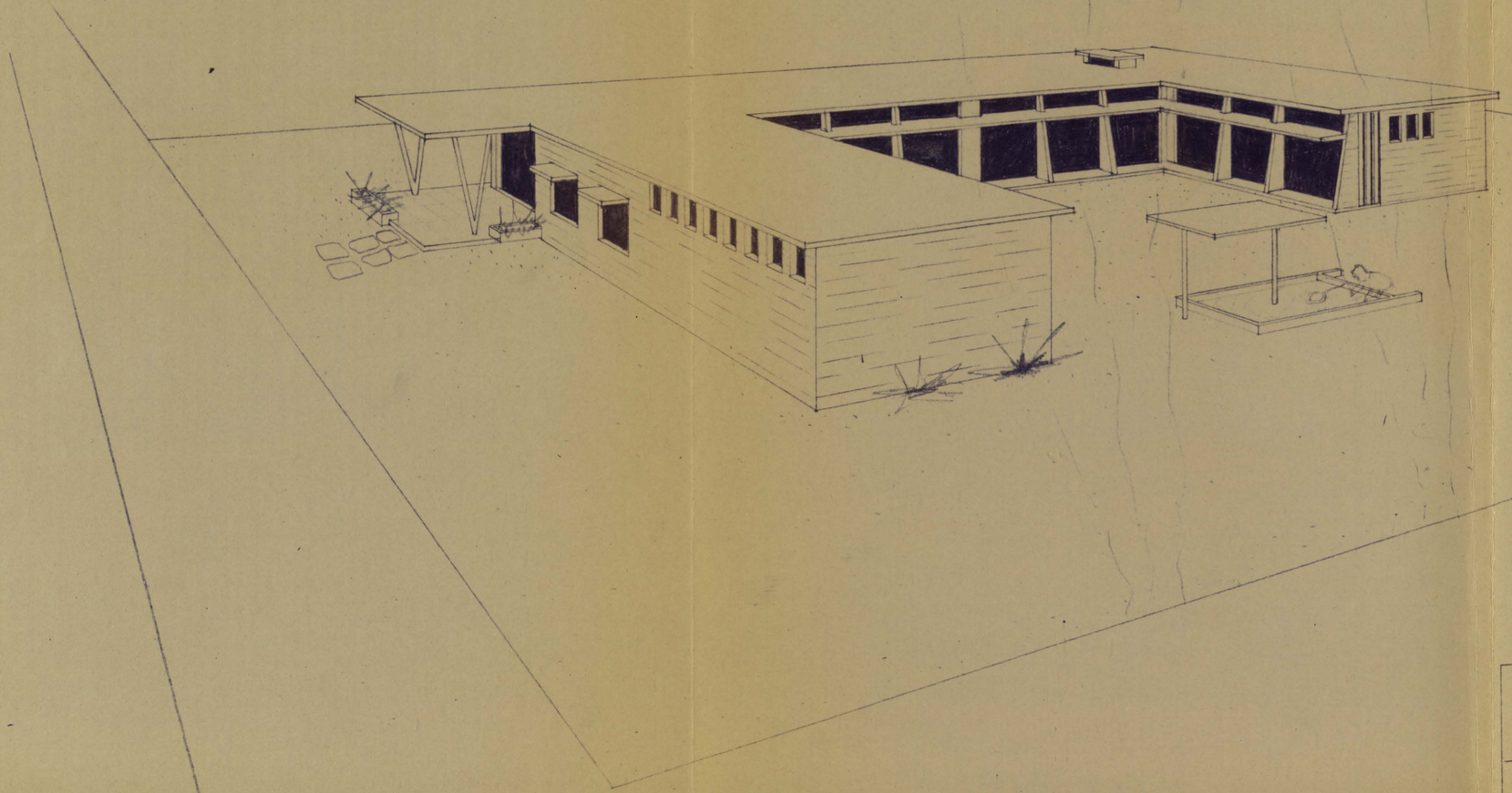
Pipes
etc.





GENERAL SANITARY SYSTEM OF SCHOOL
SCALE 1:100

PROJECT : NURSERY SCHOOL	
TITLE : SANITARY LAYOUT (PLUMBING)	
SCALE : 1:100, 1:50 DATE : MARCH 1956	
A.U.B. SCHOOL OF ENGINEERING ARCHITECTURAL ENG'G. PROJECT NAME : VICTOR SHIBER	10/11



PROJECT : NURSERY SCHOOL
TITLE : EXTERIOR PERSPECTIVE
SCALE : 1:00 DATE : MARCH 1956

A.U.B. SCHOOL OF ENGINEERING
ARCHITECTURAL ENG'G. PROJECT
NAME : VICTOR SHIBER.

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